Decide to Sing
Sing to Decide

Neroli Needham

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Dedication

To all my guides and teachers in life.

Acknowledgements

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Table of Contents

Preface....................v
Introduction....................1

Part One: The Problem Outlined

1 Choice: balancing reason and empathy....................7

1.1 EQ—empathy: recognising its role....................8
1.2 Uncertainty, collaboration and empathy....................13
1.3 IT: one part of the solution....................15
1.4 Proximity and its influence on empathy....................19
1.5 Empathy and information....................22
1.6 Power sharing....................26

Part Two: The Solution Proposed

2 Song and the Emotions....................35

2.1 Song as solution—the rationale....................36
2.2 The evolution of music and language....................38
2.3 Music, language and future decision making....................42
2.4 Choral Harmony—my experience....................47

3 Introducing CP and IP....................51

3.1 Mental processing styles....................51
3.2 Analogies to CP....................54
3.3 Mental processing in Language....................57
3.4 Mental processing in Music....................61
3.5 Mental processing in Song....................67
3.6 The advantages of Song-based CP: reinforcing key points....................70
3.7 Permanent and portable CP: IP....................73

4 The Science....................81

4.1 Study choice....................81
4.2 Music, empathy and decision making: what the science revealed....................83
4.3 Recapping the influences....................87

Part Three: From Proposal to Proof and Implementation

5 The Practicality of a Song-Tool....................95

5.1 The proof-practice interdependence impasse....................95
5.2 Specialisation and the will to sing out....................97
5.3 The appeal of Choral Harmony....................99
5.4 Workplace Choirs....................100
5.5 School Choirs....................105
5.6 Back to the individual....................108

Abbreviations....................111

Table of Figures

Figure 1—Measurement of Costs and Benefits 23
Figure 2—Savings to the Year 2100 24
Figure 3—The Music-Language Partnership of Song 46
Figure 4—CP and CP-Like Mental States 56
Figure 5—Language: Linguistic Elements and Meaning 57
Figure 6—Language: Meaning and Processing 60
Figure 7—Music: Meaning and Processing 63
Figure 8—Song: Meaning and Processing 68
Figure 9—Literature Search Focus 84
Figure 10—Concept Influences 87
Figure 11—Appeal of Music Types 99

Preface

The seed for this book was probably planted a quarter of a century ago, when I went to live in North Queensland, not far from the junction of two World Heritage Areas: the Wet Tropics and the Great Barrier Reef. In those early days, I had no idea that the World Heritage values of both properties might be at risk. Made aware they could be under threat from residential development and economic activity, I wanted to know why. I'd considered, but dismissed, process capture by self-interested individuals (it seemed too facile to be a complete answer) when I chanced on the literature relating to decision making under conditions of uncertainty. Recommendations differed in detail but the message was often the same: when there's much that can't be ascertained or controlled, take out insurance—spread the load. Spreading the decision-making load amounts to exploiting the informational diversity inherent in different mind types and mental processes.

Sound advice, but how to make use of it? Time slipped by. Circumstances and priorities changed. Then I moved to the Shark Bay World Heritage Area. Facing, once again, the spectre of those threats, I was compelled to revisit the issue. I became convinced a first step, if we're to turn diversity to account, would be to remodel our mental processing, learn to work concurrently with the intelligences of heart and head. Five or six years more had to pass though, before it dawned on me song might be a way of achieving that. So absorbing was the concept of song as a tool geared to wisdom in choice that it was a foregone conclusion I'd attempt to convert intuition to reasoned argument.

Hence this document. It was never intended to amount to comprehensive exposition—be a 'scientific' work. That would have required a literature review, proof of concept and a concerted endeavour to distinguish my efforts on the subject from those of others. It would also have made it more difficult for me to pursue the somewhat idiosyncratic train of thought which emerged from a very lengthy gestation period. Having ridden that train to the last station, I hope there might be something in the territory explored which might provoke productive discussion, that its limitations won't prevent it being approached seriously—in a spirit of serious play, that is; toyed with, at least.

Lewis Thomas said of Lovelock's *Gaia*:

> "This is not likely, in my opinion, to lead directly or indirectly to any specific piece of new technology to be put to use, although it may very well begin to influence, in new and gentler ways, the other sorts of technology we might be selecting for use in the future." [James Lovelock, *The Ages of Gaia; A Biography of Our Living Earth*, Oxford University Press, Oxford, 1989.]

Introduction

Humanity as an outcome of ‘evolution’, as a chance product of change consequent on feedback loops between nature and nurture: it’s a familiar concept and as accurate as ever—except for the balance of power between players. For most of Earth’s history, nurture drew on, and was responsive to nature; nature, therefore, was the real driver of evolution.[1] Then came widespread recognition of the merits of the ‘scientific approach’ and, in a relatively brief span of time, our species advanced from a state of near powerlessness in comparison with nature to that of pre-eminence. In the Anthropocene, no longer merely ‘subject’ to evolution, humans are co-drivers of it, alongside nature: works-in-progress though we remain we are, to a significant extent, the designers of our own minds, bodies and spirits—as well as re-designers of the world in which we live.[2]

But here’s the thing: opportunity is never free of obligation. Our power renders us responsible for life. The wellbeing of all life is now in our hands, dependent on our nurture, our choices—everyone’s, the almost continuous stream of decisions each of us makes daily in our quest to meet needs (perceived or actual) and desires. We’re seldom sensible of their potential reach—go about making decisions as if their impact outside the personal sphere was negligible. If once that was a fairly realistic assumption, it no longer is. As the world is today, it’s senseless to proceed on the basis of dichotomies—here and there, now and then, private and public, us and them. Everything is inextricably interwoven.

It follows that there’s scarcely a decision, small or large, which wouldn’t have some capacity for far-reaching, if imperceptible, ripples of influence. If our choices here, today, determine those open to others everywhere, tomorrow, then it’s inadmissible for any of us to act as if we weren’t accountable for humanity’s gravest problems. The earth is within our care. Or, more aptly, without it, if the current suite of global conundrums is anything by which to gauge our stewardship! Far from solving the seeming perennials—issues such as war, poverty, inequality, pestilence, addiction, famine and human rights abuses that the bulk of societies have confronted since time immemorial—we’ve added a few twists to some, increased the frequency of others and even managed to expand their number to include the odd one that would have been inconceivable a few short generations ago.

The world is swiftly becoming our creation, but what we’re creating is anybody’s guess: technology is the root of our power to refashion the world and advances in technology tend to be self-perpetuating. That said, choices shaping the environment in which innovation occurs set the course for technological development. We can steer it towards delivery of outcomes which ensure compatibility between man-made and natural systems, towards sustainability. The single biggest step we could take in that direction would be to augment the diversity of inputs to decision making—incorporate a greater range of perceptive abilities distinct from rationality. Diversity is being accorded greater recognition, stimulating adjustments that will facilitate institutional accommodation to neuro-diversity—for example, the numerous techniques devised in an attempt to bring non-linear and/or non-verbal mental processing into the fold. For all that, we're nowhere near reaping the benefit of the mental processing variety with which humanity is endowed.

One explanation is presumably that capturing the benefit of variety presupposes an increase in the breadth of the decision-making catchment, something that, in a hierarchically-structured organisation, could be perceived as tantamount to a redistribution of power. Another could be the methodologies employed. Almost invariably, techniques such as those referenced above are circumscribed in their operation—confined to what may be only a single phase of the decision trajectory—and/or maintain a cardinal role for language when it counts; when a decision is to be made. [Unless otherwise specified, 'language' means verbal communication, oral or written. That is, for all the beauty, complexity and efficiency of, for example, 'Sign', I've felt it necessary to restrict the compass of discussion to word-based language.[3]]

To the extent that arriving at a conclusion is a linguistic enterprise, it must be a step-by-step affair, channelled by the same linear mental processing skills that afford us our quantitative strength; these are ill-suited to translating output from the non-linear forms of cognition (aka 'pattern seeking' mental activity or 'pattern processing') which guide qualitative judgements. In consequence, I suspect that many insights which might have emerged from the application of these methodologies are lost en route: habituated as we are to linear workplaces, with their emphasis on logical thought and top-down management, it can be difficult for us to appreciate the value of dissimilar approaches and that has the effect of restricting options.

Ironically, proto-humans may well have encountered a lesser obstacle, if (as I'm persuaded) their habitual mode of cognition was concurrent, synchronous processing of fact and feeling. For those early ancestors, day-to-day communication would have been a pastiche of anything and everything that served to get a point across—of gesture and mime, but also vocalisations which, in the fullness of time, gave rise to the streams we today label language and music. It stands to reason that there'd have been a cognitive counterpart to this divergence, a parting of the major mental-currents with each building on its long suit—linear processing as the differentiator; pattern processing as the integrator. Despite the obvious complementarity of those specialisations, reliance on linear processing increased disproportionately. The most essential vocalisations, those with communications or decision-making intent, would have benefitted from specificity. The utility of language might then have predisposed to linearity in conscious mental functioning. Relatively speaking, we remain unaware of what pattern processing's forte—detection of commonalities—can reveal.

That has to be fixed, for we've scant hope of achieving sustainability while decisions exclude the information available through non-rational ways of cognising—fail to respect all ways of interacting with the world, all lived experiences of it. 'Correction' boils down to regaining something akin to our forebears' aptitude for concurrency. We can't turn back the clock of evolution (and wouldn't wish to); we can call into service a manifestation of that ancient concurrency which has survived the ages: the all-but-universal tradition of song. Though language and music now satisfy largely unrelated requirements, they remain partnered in song; it's the only human activity I know of which is equally reliant on linear and pattern processing. However, that's not all song has going for it. Since popular group forms nearly always include a strong element of co-operation, engagement with them pre-attunes to collaborative decision making. For Choral Harmony, co-operation is all-important—careful blending within and between vocal parts; the will to participate actively yet indistinguishably. Properly executed, the form is unrivalled, therefore, in its reinforcement of the language and music synergy in song. That must give it a concurrency-inducing edge.

In essence, it's my belief that regular participation in Choral Harmony could hone our underutilised prowess in processing concurrency, thereby easing transition to those more inclusive, co-operative, outcome-determination procedures which might equip us to avert a sustainability crisis.[4] Song teaches our brains they don't have to block the intelligence of the emotions lest it contaminate reason in decision making. If I'm not mistaken, that lesson would endure, enabling us to slough off cognitive bias—cognise, anew, from a place of concurrency but at a higher turn of the evolutionary spiral. That's something worth investigating.

Perhaps you're disturbed by my proposal, fear that to fashion of song a tool could precipitate a perceptual shift which would detract from the beauty song brings to our lives or subvert its contribution to our emotional wellbeing. I wouldn't have come this far if I'd thought, for a moment, that might happen. Song-as-tool is nothing more than a subset of Art-as-tool and there's a long history of art, including music, in service to worthy utilitarian ends (political, therapeutic and financial causes, for example). Why then should we hesitate to extend culture's role—entrust music with the task of bringing about a greater harmony, one which would transcend boundaries to encompass all who choose and everything affected by our choices. Music can be both: joy and tool.

Decide to Sing has a tripartite composition. Part One, *The Problem Outlined*, motivates Part Two, *The Solution Proposed*, with practice taken up in Part Three, *From Proposal to Proof and Implementation*.

Part One (Chapter 1) explains my perception that much of the difficulty we face in achieving global sustainability can be understood by reference to an aspect of the dominant, Western decision-making paradigm—within it, IQ rules; EQ is too often silenced. The food sector is used to illustrate how that inequality is distorting everyday decisions. There follow causal reflections: how things might have come to this—why we're so reluctant to heed the guidance of EQ attributes such as empathy when choosing between alternatives.

Part Two proposes that A Cappella Choral Harmony could redress the EQ-IQ imbalance in decision making noted. Chapter 2 outlines the influences—chiefly theories regarding the evolution of music and language, and the experience of singing in community choirs—which led me to focus on that particular Group-song form. Chapter 3 lays out the conjectured mechanism: the possibilities offered by song's fusion of music and language. Chapter 4 covers findings from research into the neural correlates of empathy and/or music, or the cognitive effects of music exposure: science propounded in support of that conjecture.

Part Three (Chapter 5), looks at the shape a musical solution might take: what could be involved in moving from theory to practice.

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[1] I intend that statement in the sense of the ‘modern evolutionary synthesis’, which adds genetics to natural selection in explaining evolution.

[2] For several reasons, I hesitated to use the term ‘Anthropocene’. Strictly, epochs are defined by reference to geological criteria but, that aside, some argue the Anthropocene hasn’t yet started because humanity’s biggest impact on earth is still to come.

[3] I’d love to be involved in research into Sign-based decision making, with coverage of everything from neurology to outcomes.

[4] Use of terms such as ‘sustainable’ and ‘sustainability’ has become somewhat controversial these days. Definitions abound, and that can lead to misunderstanding, overuse and misuse/abuse (for instance greenwashing). It’s also been pointed out that, since some use of natural resources is always involved, none of the actions or decisions most commonly described by these terms can be truly sustainable—only more or less sustainable than an alternative—and so should always be accompanied by a rider. On the other hand, I know of no more concise way to express the principle which I believe should guide our actions and decisions. My approach has therefore been to place us (as nearly as possible) on the same page by providing two definitions which approximate my understanding of that principle.

The first, from the 1987 United Nations Brundtland Commission Report (and one of the most frequently cited), defines ‘Sustainable Development’ as: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” The second, the official International Panel on Climate Change (IPCC) definition adds: “… and balances social, economic and environmental concerns.”

That addition by the IPCC effectively incorporates a ‘Triple Bottom Line’ (TBL) imperative. My use of TBL is as a ‘catch-all’ for needs of every description.

Part One:

The Problem Outlined

1

Choice: balancing reason and empathy

It’s a wicked world we live in! It may once have been rational to believe we could rely on our capacity for logical assessment to overcome the challenges we faced as we went about the business of recreating our world, moulding it to our requirements. No longer: it’s from our past successes that far too many of our present challenges were born, some so intricate—involving so many interdependencies and so many people with disparate, equally valid, requisites and outlooks—that it would be naïve to expect we’ll have enough information, let alone assume there can be a single, ‘correct solution’.[1] No, the Age of Reason has well and truly ended. Reason is apt to deal with factually-based decisions that can be managed linearly from idea to action. When facts are few and far between, when we’re operating against a backdrop of uncertainty, strictly logical courses of action are unlikely to be wise.

Management of uncertainty, I’ve come to accept, requires a willingness to leave things open-ended and blurring of boundaries foreign to linear mental processes; it’s best tackled with fuzzy thinking by individuals—thinking which admits our experiences can exist on a spectrum—and co-operation between them. [This is unequivocally the case when steering matters that polarise or we’re prone to stigmatise—for example, sexual orientation, mental health, illegal drug-taking, dying with dignity, abortion, incarceration and climate change.] We’re products of nature and nurture, a genetics-life loop which has for result that none of us experience the world in quite the same way—that each of us has something to bring to the table. Our best prospects for resolution of intricate, compound problems lie in co-operative exchanges which draw on that diversity.

For a long time, I thought that was too obvious to be ignored and reckoned management practices would become more pluralistic. Signs of a turnaround notwithstanding, progress toward more inclusive decision making has been patchy and slow; we continue to marginalise mind-types which deviate from a narrowly ‘reasoned’ standard. It worries me that if we don’t act soon we’ll find ourselves facing a sustainability crisis—and it could come at us from an unforeseen direction.

Take the food sector for example. We know that choices made within it are intertwined with many disquieting worldwide issues: land degradation, unfair trade practices, biodiversity and habitat loss, animal rights abuses, fresh water scarcity, air quality, chemical use, plastics pollution and fossil fuel-induced global warming to name a few.[2] But consider this: in as much as food supplies the raw materials with which nature constructs our brains and bodies (‘We are what we eat’), the blueprint for, and building blocks of, human cognition would be susceptible to choices made the length of the ‘food-chain’. Weaknesses in that chain (poor past personal and production system choices) could leave us ill-equipped to choose a wiser path in future—to take steps toward ensuring we’re well-nourished, ergo well-placed to acquit ourselves responsibly as the co-drivers of evolution that we’ve become.[3] The formation of such an ultra-wicked circuit might remain largely invisible until a moment of crisis arose.

Although nearly any area of social and economic activity could inaugurate a nature-nurture feedback loop, few are likely to be quite as pernicious as that hypothesised. Raising it here serves two purposes: it acts as a reminder that rectification of past collective mistakes is a local remit—a shared responsibility; and it does duty as a measure of the complexity we may encounter in seeking to address the planet’s woes. When grappling with enormous complexity, reason—IQ—is inadequate and intelligences actuated by emotion—EQ attributes—come into their own; none more so than empathy, without whose guidance it would be imprudent to imagine we can fruitfully manage diversity.[4] Alas, few of us could boast we contend as well with subjectively- as objectively-derived information.

That, in a nutshell, is the titular ‘Problem’ of Part One. Accordingly, this chapter begins with contemplation of cause. Discussion, in centring on empathy, will include, inter alia: reason’s rise to prominence; ‘Proximity’ as a factor in empathy arousal; and empathy apropos of ‘unquantifiables’.

1.1 EQ—empathy: recognising its role

IQ and EQ give access to contrastive data sets. IQ, through logic, is the foundation of our analytical ability; it’s tied to our dichotomising instinct and can alert us to where differences lie. All the same, what began as distinction can end by paralysing progress if it blinds us to similarity or complementarity. EQ’s synthesising traits avert that risk; it’s a past master at finding room for other times, places and lives—at piecing parts together harmoniously. EQ, but most of all empathy. Distance—temporal, spatial or social, between a problem and those deputed to solution—heightens the probability of empathy taking a back seat to reason. When it does, ‘solutions’ may be bereft of true understanding, based on factual knowledge unleavened by insight. The tyranny of reason unenlightened by empathy is on a par with the converse. Empathy is an obligate, qualitative complement to the quantitative in problem solving—and a point of departure for elaboration of personal moral codes. Empathy is adaptive and inclusive. That’s why, of EQ’s myriad facets, it’s empathy that will feature in this section.

[Some definitions of empathy specify ‘cognitive’ and ‘affective’ elements. The cognitive part is the intellectual apprehension of others said to precede the affective (emotional) response awakened in us by their behaviour. I accept that empathy requires both. Nevertheless, I place empathy under EQ’s banner because I think of the latter as preponderant when empathising (IQ when reasoning) and will distinguish between the said components only where it avails my argument to do so.]

Colloquially, empathy is the ability to put ourselves in the mental shoes of another. On occasion though, it may be used interchangeably with ‘sympathy’—self-referentially presuming that others feel as we would in their situation. That can’t do justice to my conception of empathy. To empathise is, as I see it, to put aside our own animators and prepossessions, and give ourselves over to sensing what someone else is going through. It's as if we, momentarily, become that person. [As it happens, empathy was co-opted to service in psychology because sympathy can be felt without sharing the other's feeling—not that we can ever quite register the other's perceptual experience of a sense stimulant; no two brains are identical.] That's what casts empathy as a higher-order attribute than sympathy; it's integrative.

Sadly, even amongst those whose professional calling is grounded in an intense interest in others and wish to help them, there may be empathy failure. A case in point is the psychologists who, in the 60s and 70s, weren't slow to seize on practices incorporating 'aversive stimuli' (a euphemism for punishment) to promote learning and bring about behavioural change in cognitively disabled children and adults, including some with autism.[5] Another is the application of so-called 'avoidance learning' for no other motive than reluctance to tolerate anodyne deviations from what was judged normal. There are instances of young, male children displaying 'sissy boy syndrome' (enjoyment of 'effeminate' pursuits—dressing up in mum's clothing for example—which it was feared were symptomatic of adult homosexuality) being subjected to it on the advice of an acclaimed psychologist.[6]

With hindsight, empathy was, in those instances, suppressed by intellect. Patients were expected to adapt, not the therapists (or society). There was none of the 'true listening' (marked by precisely that 'setting aside of self' which I ascribed to empathy) M. Scott-Peck felt was necessary for a speaker to lose their sense of vulnerability and open up the inner recesses of their mind to the listener. Their treatment could be, at best, a bid to substantiate theory: their methodology did nothing to ameliorate understanding of the individuals treated or instigate review of practice and research.

If trained psychologists can be so wrongheaded, it's hardly surprising that for many of us, much of the time, speaking should dominate listening. Still, that doesn't explain this aspect of our psychology. It's my guess the explanation lies in the origins of language itself. For our earliest forbears, I daresay communication was an audio-visual pastiche , a blend of facial gestures, bodily movements and vocalisations exacting careful listening and observance. By some later date, much of the information thus acquired had come to be packaged in words; their relative precision could have altered the balance within audition, obviating the need for active listening—making it adequate to hear.

Other explanations have shorter timelines. For example, I heard a radio programme on "the seemingly lost art of listening and what being responsive can mean in the modern world". Panellists didn't resolve the question of our apparent inability to genuinely listen but Tanja Dreher raised this hypothesis: that it could be dated to Aristotle and his emphasis on speaking as the foremost way in which we're active in public life.[7] She herself feels that "listening also operates at a much more complex level, as a social and political process", as evidenced by the Rudd government's apology to indigenous Australians.[8] As Dreher put it, the apology was delivered by Rudd. The rest of us took part by listening; we took the time:

> "to pay attention, to maybe shift our understanding a little bit, to reflect, to make that space, to silence other issues and concerns for a time and really pay very close attention, and also to be challenged to think about, well, what comes next, what comes after the apology or what comes after our particular listening moment here."

Therein may lie a second excuse for superficial listening: reflective listening exposes us to the danger of being persuaded to—feeling obliged to—change. Our response, where deep listening isn't an automatic pattern of behaviour, may be to 'tune out'.

Thankfully, we can take heart from lapses of the sort in that, being exceptions, they prove the rule that (most) humans meet the neurological preconditions for empathy at birth. That's how Goleman sees it.[9] Empathy is inborn, he writes, but as the substructure of team-building and rapport with others, it requires self-awareness; to understand the feelings of another, you must first be able to understand your own. [This bears out my view of empathy as a higher-order attribute than sympathy.]

It's because, self-awareness takes time to grow that Goleman doubts it's empathy at work when a very young child reacts to the hurt of another as if hurt itself. This proclivity—exhibited by babies as of birth—may, in his view, herald empathy, but isn't empathy itself; the child won't yet have learned it's a separate being. Typically, it's not before adulthood that we'd have the self-awareness to empathise automatically and subconsciously, albeit that individuals would do so with varying degrees of engagement and sensitivity. So complete is this responsiveness for some people that their own physiology may come to mirror that of the person they seek to understand.[10] Brain disorders (innate, or on the back of accidents or surgery) may situate another group at the other extreme, prevent them either receiving the emotional content of non-verbal signals or comprehending the feelings of others.

Between the child and those adult exceptions is the regular person, cognisant that others, too, feel joy and pain, aware that the feelings they detect aren't their own and with a choice: to tune-in or tune-out. Being afraid of suffering in sympathy or unable to resist the impulse to help are further reasons why we may opt for the latter. Goleman reminds us that although empathy 'distress' (feeling swamped by an emotion) and 'burnout' (emotional exhaustion) are real phenomena (most commonly encountered in highly empathic people), they can be avoided with suitable self-regulation skills; other-orientation doesn't doom us to them.[11]

Goleman likewise dismisses another popular misunderstanding which may see us turn a deaf ear to empathy's urgings, that to empathise is to be in concert.[12] Altruism takes it for granted that action is with others in mind—implicitly, that it involves a shelving of self-love and repression of many 'normal' personality forces. Empathy only asks a prerequisite for altruism, the ability to feel as others do, to understand what they experience and why.

Charged with getting us inside the head of another (intuiting how they might be feeling), it sets us up for action which, while respectful of their feelings, may, or may not, validate the other's aspirations. With its less onerous initial provisos, it's a feasible ambition, and there's room under its umbrella for life other than that of humans.

If you're unsure whether empathy and listening skills go hand-in-hand, this is what Adam Grant has to say about the benefits of the latter:

> ‘In a series of experiments, interacting with an empathetic, nonjudgmental, attentive listener made people less anxious and defensive. They felt less pressure to avoid contradictions in their thinking, which encouraged them to explore their opinions more deeply, recognize more nuances in them, and share them more openly.’[13]

Those benefits, he continues, flow as much in group, as one-on-one, interactions.

The goal of a sustainable world—an unambiguously empathic one, conspicuous as much for receptive listening as reasoned contemplation—is attainable but I’m under no illusion it can be easily met, that promoting empathy can do much to turn the tide. It’s most plausible that empathy will be both educed and successful in its conjectures when we’ve an impression of closeness between us and another/the other. Yet it’s precisely when the opposite circumstance obtains, when there’s a dearth of closeness (or what, pre-empting a later section, I refer to as ‘Proximity’), that we could most do with it.

If we’re to exit that dead-end we’ll have to compensate, design around what we must put up with (distance—lack of Proximity). We’ll have to plan regular exercise of our empathic abilities along with our critical faculties, cultivate a capacity for empathy which transcends the dictates of the familiar, learn to make of empathy a habit. Achieve that and our dream of a sustainable world would become a reality.

Clearly, empathy has several close relatives I could have chosen as the lynchpin of my sustainability theme. Altruism and sympathy have been mentioned; compassion not yet. The literal (Latin) meaning of compassion is to ‘suffer with’. Usually read as kindness and respect (qualities integral to trust where differences exist), it may be read as covering a desire to assist. But compassion may also have an undertone of ‘living with difference’ which would have conflicted with what I wanted my term to convey, namely a more active cognitive and affective effort to take on board the thoughts and feelings of others.

EQ and empathy, IQ and reason. Complementary, interconnected and interdependent. The yin and yang of wisdom. How might it be that we in the West have come to so elevate one half of this duality that the other became subservient to it?

Westerners are devotees of reason, profound believers in the superiority of objective mental processes—of the ‘scientific method’. On some accounts, the roots of the method are traceable to 10th-11th century Iraq and a Muslim scholar, Ibn al-Haytham (Alhazen) who is said to have argued for the formation of testable hypotheses. His foundational conditions were empirical evidence and its subjection to specific principles of ‘reason’. Following its adoption by Galileo in the 17th century, the scientific method came to characterize natural science. The aim was to bring rigour to scientific inquiry, remove the harmful effects of circumstance and personal bias in order to yield objective results.

Reason, in that discourse, referred to a derivative of Greek ‘logic’ the practise of which entails a conscious effort to arrive at ‘truth’ through a consciously structured cognitive activity. The ability to think like this, it was believed, had emerged only in the left half of our brains, leaving the right half to gaze on the world through an older, less refined lens tinted and distorted by myth, faith and superstition: by the emotions. [This was the perception amongst those who realised the brain had anything to do with our experience of emotions at all; for many, they were unconnected with that admirable organ—were a product of the senses, therefore of the sordid flesh of the body.] Emotion was an antonym of intelligence—at least for the educated; ordinary people were happy to rely on ‘instinct’ or ‘intuition’. Confining oneself to linear thought would ensure that the left cerebral hemisphere alone was on the job, conducing to ‘intelligent’ (objective, unbiased) judgements. From Descartes’ time on, those other ways of knowing were, bit by bit, excluded from even demotic concepts of intelligence. It came to be defined by reason as the highest expression of the single brain feature seen as setting us apart from other animals: aptitude for linear thought.

Compartmentalisation of the brain isn’t totally unfounded; the cerebral hemispheres do exhibit dominance for particular mental processes. Left hemisphere activity tends to outweigh right during linear thought. Control passes to the right hemisphere when we become emotionally aware—in the transmission and reception of emotional messages. Withal, research in recent decades has shown it to be a figment that ‘emoting’ is a right hemisphere function, and well and truly pulled the rug out from under our mistrust of the emotions as a fount of intelligence. Decisions reliant solely on emotionally-derived information (arrived at with no recourse to logic) are ‘non-rational’, but it would be no more defensible to dub them ‘irrational’ (or ‘illogical’) than to claim, when similarly short of evidence to the contrary, that a reasoned approach was ‘unemotional’.

No, ‘reasoned’ and ‘emotive’ aren’t mutually incompatible states of mind, and most mental activity engages a wide range of brain regions and cognitive abilities—necessitates both linear and pattern processing. [I’ll be devil’s advocate and quip that a rational mind is a rule-bound mind, and it’s oft been said the rules governing our thinking aren’t always those of the real world. What we call rational is what conforms to the set of rules (frame of reference) we’ve adopted. Nothing says that won’t one day change (as the birth of Quantum Theory changed the Newtonian physicists view of reality).]

Damasio is emphatic: there’s no single brain centre for processing emotions. Emotional centres are pervasive in the brain—essential to conscious life.[14] Moreover, he’s persuaded that emotion aids reasoning in any situation where ability to respond appropriately is by virtue of capacity to read the non-verbal cues emitted by others—and most when we’re dealing with personal and/or social matters that involve risk and/or conflict. Selective reduction of emotion is, for him, as prejudicial for rationality as an excess of emotion; lose contact with our own feelings and (as did a patient of his) we could become computer-like—competent but dispassionate.[15]

Duncan and Feldman Barrett go further; they suggest that the distinction between ‘affect’ (the underlying experience of feeling, emotion or mood) and ‘cognition’ (the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses) has no discernible basis in ‘reality’, is a subjective experience.[16] Elsewhere, Feldman Barrett pronounces emotions the brain’s creation—the guesses, or predictions it makes in an effort to explain our feelings—using past experience.[17] [18] That, she affirms, lets us be the architect of our own experiences: change the ingredients with which the brain works to make emotion and you can reshape your emotional life.

For the vast majority of us, subjective and objective information are jointly determinant of cognition; knowing that we can reason with our response to experiences, we're coming to terms with such propositions—accepting the reciprocity of reason and the emotions. But although EQ now has far more than notional endorsement outside the sciences, its undeveloped, and much which could inform our choices doesn't: our fixation on reason precludes entry into consciousness of the 'unreasonable'. The upshot is that there's been no decisive shift from theory to practice; we carry on with predominantly rational systems. Our intellectual priming—the training and education that occur in workplaces, educational institutions and the home—continues to incentivise logically-valid thought processes, downplaying conclusions reached through any 'less rigorous' mental process.

Basically, our ability to differentiate, categorise and specialise, though it has served us extraordinarily well, has had an unwonted effect: we excel at singling out parts but many of us, much of the time, are unperceiving of the wholes that could be known if we stepped back and gave them half a chance to surface. The good news is, that makes our emotional brain an under-exploited resource it would pay dividends to potentiate and refine; our ability to make headway with questions for which there is no factual answer would be much enhanced by power sharing within, as well as between, minds.

1.2 Uncertainty, collaboration and empathy

When nothing you do can guarantee success, risk management steps to the fore and it makes strategic sense to spread the load. 2000 years ago, Chinese traders planning to cross the turbulent, flood-prone Yangtse Kiang (the Yellow River) did that. Literally. They fronted the river as a group, distributing each trader's goods across all traders' boats. In taking on the near certainty of a small loss, each avoided the possibility of total loss should theirs be the vessel to sink.

Crossing the Yangtse was a quintessentially risky venture. In many areas of life, neither the magnitude of undesirable impacts should we err, nor the probability that we will, may be as plain. And that when they sometimes ought to be; we tend to overlook the fact of risk. As Kathryn Schulz notes, we grant St Augustine's 'to err is human' dictum—until it comes to our own here and now; then abstract appreciation of humanity's fallibility may go out the window.[19] For her, this 'error blindness' grows out of (culturally inspired) fear of 'failure', with which being wrong is too frequently conflated. We're called to make that distinction, relinquish our attachment to being right, accept our fallibility and consult.[20]

That general attitude is our insurance. Corporate management gurus concur; a collaborative effort is crucial to obtaining optimal outcomes when uncertainty reigns. Take McKinsey's Lowell Bryan for example. He agrees existing management techniques for coping when things are up in the air can help people learn to think in another manner about the future but asserts that, to make the most of them, companies will have to expand the breadth of knowledge behind their application and transform the interplay between parties embodying that knowledge.[21] How ambitious an undertaking that proved to be was said to hinge on organisational structure; the more hierarchical and non-collaborative the tougher the commission.

Though Bryan's article was written with major corporates in mind, I don't doubt the relevance of his advice (and that comment) across sectors and scales. It's not in hierarchical organisations—public or private, of any size—to groom for effective collaboration; hierarchy brings with it an incentive to competitive behaviour.[22] That aside, it pays to remember that, in its competitiveness, organisational culture is a reflection and reinforcement of a besetting personal trait—the inclination to compete rather than collaborate—which, perhaps as fear of failure, would ordinarily have begun to form well before we enter the workforce.

Major change is never effortless. As they struggle to instil a collaborative ethos, organisations must contend with personal belief systems—deeply ingrained principles and values that may not be consciously maintained—and, in the workplace as in our private lives, old habits die hard. Faced with imminent catastrophe, we act with alacrity and any progress made may rouse us to further action. We're understandably more hesitant to act when things are hazy and we're unsure as to what stalling might portend, most of all for ourselves. Now allow that competition rewards the sure thing. If we want commitment to non-competitive—collaborative—activities with unascertainable payoff, organisations will have to reward both the *possibility* of obtaining sustainable solutions and the *actuality* of profits.

For that not to be pie in the sky, if hierarchical, competitive organisations are to make a speedy transition, tailored provisions will be required. The collaborative disposition is conditioned by intuition and rationality—aware of connectedness and with insight into both the mechanisms by which it operates and its import. What we're talking about then is competitors collaborating to utilise the inspiration of diverse cognitive processes—strike a high-calibre balance between the complementary skills exhibited during quantitative and qualitative processing, between IQ and EQ. Congruous arrangements would develop pattern processing capability as a counterforce to linguistically-expressed, logically-derived conclusions employing linear mental processes.

An abundance of methodologies targeting just that (many of them originating in the corporate sphere) has evolved over the years and achieved a measure of acceptance. For example, Six Thinking Hats, brain-storming, brain-steering, collaborative visualisation, mind-mapping, mindfulness and World Café are variously designed to help us think 'laterally', 'creatively' or 'outside the box', tap into a 'group mind' etc. But use of these methods, if not uncommon, isn't frequent; they tend to be reserved for irregular events (Workshops, for instance). In giving thought to that failure to catch on, I shortlisted a number of factors.

One is reluctance to tamper with a 'proven' formula—respect for the successes of the scientific method . Another not to be written off is being out of one's comfort zone. We know that unwillingness to change is seldom entirely rational. For those accustomed to a pattern of work which repays single-mindedness and a narrowly-focused attention pattern—repays linear thinking skills—the free-flow of group creativity may discomfit (as it may the introvert). There are also bound to be some who, loath to take them seriously, participate half-heartedly in these looser sessions or avoid them as a waste of time. In so doing, they reaffirm the decision-making prerogative of the ordained leader (or leadership team). Leadership style may pose its own problems. It can be awkward for individuals on lower rungs of a hierarchical ladder to take a non-reasoned stance in the presence of higher-placed colleagues. And the latter, wont to be in command, may find inclusive processes alarming or equate them with dereliction of duty.

Then there’s staging. By far and away the majority of practices calculated to generate creative ideas and solutions add, and are confined to, a stage on the decision path. This may make them more time-consuming—and maybe more resource intensive in other respects—than consigning decision-making responsibility to the top of the organisational pyramid. It does handicap them.

Assume the opening item on a corporate planning agenda—problem definition—were to assemble primarily analytical thinkers. Chances are that much which should be made explicit would rest unnamed. In many tremendously vexing areas, value judgements are entangled with problem definition and without the casual play of empathy and imagination during that phase, judgements brought to it could be unacknowledged. Reverse the assumption, have early-stage delegates represent a good cross-section of the organisation: anything then generated would later undergo logical analysis. If that analysis is by a group which isn’t as comprehensive as the initial assemblage and/or won’t be making the final ruling, options until then seriously deliberated may be reasoned away, defeating the method’s original purpose: joint accounting for fact and feeling.

But the principal shortcomings of these methodologies—those which would keep them from ever satisfactorily coming to grips with the problem as I perceive it—are these: as group techniques, they don’t lend themselves to day-to-day use by individuals, and even if they surface EQ they do little to develop it.[23] It will take something further out of left field to pivot decision making, spin it around from a conversation dominated by EQ or IQ to a dialogue between them.

I was already of a mind that song could be that ‘something’. But it would have been remiss of me to proceed with that line of investigation without having thoroughly scrutinised my instinctual dismissal of advanced technology. Computers have surpassed their human teachers in not a few areas and, exceling as they do at fuzzy logic, they’re unphased by requests to meld lucid thought and hazy intuition. An IT game plan might also attract more adherents, sooner—especially amongst those who, in future, will call the shots: the young. Justification was wanted if I was to maintain my conviction that Information Technology couldn’t be an alternative to song. [This segment (more than any other), discloses my debt to TED—as a source of both ideas and examples.]

1.3 IT: one part of the solution

I look upon IT as supercharged IQ: today we can feed computers colossal amounts of data with instructions to unearth the source of problems and churn out solutions. They do so at lightning speed, and there’s no terminal point for machine learning capability in sight. For the many who are biased towards rationality and pitted against wicked problems, we should anticipate their line of attack/defence would be software development. However, as far as I know, nothing thus far invented can do for non-logical forms of intelligence what computers have for logical processing; there is no external device that can hold a candle to the human brain for qualitative processing.

Am I underestimating the likelihood of Artificial Intelligence (AI) endowing computers with qualitative assessment capability? Perhaps. It’s conceivable there will come a day when machines demonstrate EQ—and that day may be sooner than I fancy. Empathy is something else. But assume an empathetic computer: would its arrival greatly improve our ability to problem-solve? If computers could emote they’d ‘suffer’, as we do, from subjectivity and we’d be in the same plight whether assessing their ethical performance relative to ours, or our own relative to each other’s. Frankly, I’m ambivalent about machines evincing EQ; subjectivity on their part could interfere with their performance in tasks reliant on absolute objectivity/ utter detachment.

Over and above criticisms of AI, ‘Use it, or lose (facility with) it’ assuredly applies to cognitive faculties—EQ included. Thanks to our mounting electronic communications-technology addiction (our readiness to let it supplant, or intrude on, direct communication) the level of EQ stimulation in daily life would already be, for many, well below yesterday’s average.[24] [Nowhere is that more so than in the IT-dominated fields destined to be powerhouses of future job-growth and in which individualism is the rule.] Of course deficiency may begin much earlier, in the home.

Throughout history and in most cultures, ‘breaking bread’ together has acted to forge or cement social ties; the provision of this exemplary form of tangible nurture demonstrates commitment. Compare that laudable tradition with what happens in contemporary Western families: it’s not unusual for their members, adults and children alike, to be more engrossed with mobile devices than in conversation when they do share a meal. Outside the home, the pattern is repeated: opportunities for connection at public and private gatherings are frittered away in electronic contact with anyone except co-occupants of the space. If adults model this behaviour, it’s a fair bet children will copy them. ‘Do as I say, not as I do’ rarely has the intended effect—and is, today, as rarely said.

Whatever might be behind parental permissiveness towards children’s immersion in the e-world, there’s no denying the omnipresence of mobile computing and networking devices has a dark side. For some skills—probably most predicated on reason/intellect—training and instruction are concentrated in external settings (schools, community groups, workplaces, etc.). Ability to make intelligent use of the emotions—certainly empathy, what Goleman refers to as “the fundamental ‘people skill’ of recognising emotions in others”—isn’t amongst them.[25] It has its roots in the home, there where relationship-forming is initiated. If we condone the intrusion of electronic communications into domestic interactions, we reduce environmental complexity (a learning imperative) and remove opportunities and incentives to enrich human relations. Relationships—social connections—gradually take shape through a unique form of mental activity consisting in action and reaction which engages multiple parts of the brain, concurrently. Now bonding—attentiveness to social information more generally—is partly regulated by the oxytocin production system, and that, if it’s to function effectively, needs to be primed through social stimulation in the formative years.[26]

There’s good cause to encourage access to IT—vanquish the digital divide: it confers ability to maintain a vast web of social and professional relationships, facilitates certain types of learning, and speeds information exchange.[27] Even so, remote connectivity can’t wholly substitute for personal exchange while de-socialised exchanges may become poisonous if coupled with a feeling of disconnection. The internet furnishes a plethora of examples.

One is the bandwagon of internet ‘shaming’. In a presentation to TED, Jon Ronson spoke to its perils under the pretence of ousting abusers of privilege, of how devastating the full consequences can be for individuals attacked (whether the shaming is evidence-based or not).[28] Children are most at risk—of both ill-considered opting-in and psychological damage if shamed. But the ease with which adults, too, can be enticed into joining campaigns leaves their offspring more than ever in want of, yet less likely to receive, the training that comes with sound, familial social-intercourse.

That makes it tricky for them to fathom which amongst clamouring media voices to credit. Staying with TED, we have Wael Ghonim’s Talk on the power of Social Media to unify and its equivalent power to divide, both on view during the Arab Spring.[29] He identified twin lines of action for any who would maximise the potential of the web and minimise its defects. They must resolve how to “make technology part of the solution, rather than part of the problem” and how to “design social media experiences that promote civility and reward thoughtfulness”. [For the rest, ‘Social Media’ is wide open to squarely misanthropic input. Research into the psychological profile of online trolls shows they’re often people who exhibit high ‘cognitive’, but low ‘affective’, empathy. In other words, they know how to hurt you and won’t hesitate to do so.[30]]

Empathy is at the core of those talks. We could regard the shaming and verbal violence they depict as nothing new; electronic versions of comportment that’s been around for a very long time. Or we could assume that the time-honoured tradition of young people making their voices heard and probing limits would have surfaced anyway, if not electronically then in the rough and tumble of some other activity. The teenager wired for sound, nose buried in an e-device and oblivious to the surrounding social hum, is then just manifesting the unsociable behaviour of their age group and their web postings are merely part of a rite of passage from adolescence to adulthood. Except that we’d then be closing our eyes to the possibility cruel, heartless behaviour on the web might stem from insufficient EQ stimulus and could be symptomatic of an ill that won’t pass.

Oscar Schwartz offers this insight into where a generation deficient in empathy might take us: more than any other bit of technology, the computer is “a mirror that reflects any idea of the human we teach it.”[31] Cold, calculating input will beget cold, calculating output. With nothing to act as a circuit breaker, humans and machines would each perpetuate the likeness of the other.[32]

[Some point to early warning signs of that mutual rubbing-off. The Turing test (proposed by Alan Turing in 1950 as a means of assessing AI) centres on whether a human evaluator could spot the human party in a conversation (in normal, written—not machine—language) between a human and a machine. Today, we could be nearing the point where a machine passes Turing’s test, not because it’s exhibiting intelligent behaviour; rather because humans—IT workers such as the machines’ programmers—are unconsciously adapting their speech to that of robots. Although that, in itself, wouldn’t connote a loss of empathy, a habit of communicating in that manner could restrict empathy-eliciting discourse.[33]]

The picture Sam Harris paints is no less frightening: that of AI gains permitting technology to get away from us. Computers (whether conscious or not) overriding us—not out of malevolence but in rejection of our intentions when they diverge from theirs.[34] It worries him that our placement on the probable "spectrum of intelligence" doesn't allow our intuitions about the such risks to be more reliable and he exhorts us to make sure we can live with the computational systems we're building. It will take flexibility, ingenuity and insight to install the necessary EQ checks and balances given the IQ-heavy SWOT profile required and amplified by IT work. I'm not alone in making that declaration: what we're hearing from many quarters is that, thanks to side-lining of the human element, the dominant problem-solving template has become unfit for purpose.

A cluster of TED Talks illustrates.[35] Three speakers: Mukherjee, Cottam and Russell. Three topics: medicine, community welfare and community policing. A single theme: rooted in top-down imposition of solutions shaped by external actors, what relief the ruling strategy affords is partial and temporary. At bottom, all three were saying that to fiddle around at the margins, throw extra resources at them, won't solve these problems either; the price of a comprehensive, sustainable solution is drastic change. In Mukherjee's words, "It is a perceptual—not a scale—shift that is required."[36] The solutions submitted didn't either abjure technology or deny the requisiteness of external backing; they sought to have them complement older, proven methodologies, central to many of which were relationships.[37] These, Mukherjee feels, must be woven into the fabric of problem solving, starting at the bottom and working up and out, so as to encircle all dimensions of the problem itself.

This plea to return to the future in well-established areas centres on the contribution individuals can make and serves to remind us that how we do what we do affects outcomes every bit as much as what we do. In a similar vein, Tufekci notes (also in the context of the internet and social change) that, while movements today are able to scale-up participation very fast, they have a fair stretch ahead in learning to "figure out how to think together collectively, develop strong policy proposals, create consensus, figure out the political steps and relate them to leverage".[38] In that respect, she avers, groups organising prior to the advent of the world-wide-web had an advantage: their slower work provided an opportunity to develop the relationships of trust and understanding that are vital to management of such projects.

Getting policy and practice right isn't smooth-sailing at the best of times and the those which preoccupied these speakers can be profound and complex—can inflict subtle, delayed, long distance effects that we may not be equipped to fully and rationally comprehend. Nor may non-rational comprehension rescue us for, as I learned from Damasio, if neither nature nor nurture has yet conspired to have us associate an object or situation with an emotion ('conditioned' us to make the association) that object or situation can't *induce* the emotion.[39] And they may not have: much of our emotional equipment dates from a period when life was simpler and there was less variation (genetic, cultural or experiential) between 'us and them', the fellow humans on whose lives our decisions may encroach.

That realisation was something of a light-bulb moment for me. Firm in my view of diversity as indispensable—only a broad perspective, one which balances EQ and IQ, can be a reliable guide in the strange, new territory we, ourselves, have unlocked—it hadn't crossed my mind that healthy heterogeneity might hinder empathy activation.

Musing over that, I kept coming back to a property of human intercourse I've named 'Proximity'. If we're to broaden the scope of our empathic response we must make every endeavour to understand it's current strictures. Exploration of Proximity duly follows—of its relation to empathy and what that might purport for decision making.

1.4 Proximity and its influence on empathy

My dictionary defines proximity as "The fact, condition, or position of being near or close by", where 'nearness' may be in terms of either space or "kinship, affinity of nature, time, etc.". Construed emotively, as the degree of attendant closeness to and/or connection with others we feel, a proximity-variable (Proximity) ought to be relevant to perspective—to empathy induction. If it accounted for an appreciable proportion of inter- and intra-individual diversity of perspective, its influence would spread to decisions and their resultants (and be the more marked as information is scarce).

Broadly speaking, Proximity supposes relations between individuals are conducive to empathy in the measure that they can be described by three, non-intersecting sub-variables—social, spatial and temporal proximity—to which I attach these meanings. 'Social Proximity' encapsulates relations between people connected by birth, marriage, culture, creed, profession and/or nationality. 'Spatial Proximity' brings in the physical space or geographic area within which individuals act and interact, and the sequel to their actions unfolds. 'Temporal Proximity' refers to the timeframe within which actions and reactions occur. [Manageability decreed that, for instance, spiritual or intellectual nearness be subsumed by 'Social Proximity'—as also that I pass over sub-variable intersections.]

That's to say our overall experience of Proximity—therefore of closeness—in a relationship would vary with similarities and differences we perceive between self and the other on those fronts. Social ties anchor our sense of belonging and a yearning to belong could motivate subordination of personal to group welfare. What's more, the ordinary citizen cares more about the wellbeing of those in their 'backyard' than of those at greater distances, and of contemporaries than of future generations. Wherefore I'd expect each of the Proximity sub-variables (Social, Temporal and Spatial) and their parent, to be positively correlated with other-orientation. In effect, I'm putting it to you that *being* closer to an individual (socially, in time and/or in space) creates a substrate for *feeling* closer to them—for them to become associated with empathy in our minds.[40] [Feelings that carry positive valence—friendship, love, esteem, respect, regard, etc.—don't enter into it. Empathy is neutral, non-judgemental; its end is full understanding of that which is contemplated.]

If Proximity is positively correlated with empathic rumination when trying to decide, it should be negatively correlated with disposition to discount away the futures of others (the costs they'll incur, the benefits they'll miss out on). The closer we feel to them, the higher we rate their wellbeing and the heavier their interests will weigh, relative to our own, in the balance when choosing. Conversely, the more distant we feel from another, the more our actions will be self-oriented, tailored to resolution of any conflict between their interests and our own in favour of ourselves. That could make Proximity an important decision-making concomitant of modern urban lifestyles.

Here's an (admittedly somewhat contrived) example of how that might work in practice. Its elements are two social settings, two randomly-chosen individuals and a 'disposable' plastic bag. The settings are 'Tribal' (let's say the Amazon Jungle) and 'Western' (a New York-type urban agglomeration). We'll call the individuals 'Fred' and 'Joe'. The bag is for retention by one of the two and it's Fred who gets to decide which of them that will be. [Although such a flimsy affair is of dubious utility in a jungle, it has novelty value (having turned up in the deep Amazon courtesy of a remake of *The Gods Must be Crazy*).]

Why that framework? It poses classical 'tribal groups' and the loose, mobile, overlapping 'communities' of an archetypical 21st Century Western city as polar opposites in relation to social structure. The structure of tribal societies is imputable to the relative stability of their world and the continuance of a culture in which more or less equal account is taken of information derived from rational and non-rational cognitive processes. This inclines to a unitary world view, in which all things are connected, and to a predominantly co-operative course of conduct with the highest value placed on dénouements that back unity within a community—a community that may be so loosely defined as to comprehend the entire material and non-material world, past, present and future.

Contrariwise, Western society might be typified by mobility and rational thought, hence a greater emphasis on how things differ (the constituents of the whole) and competitiveness. This predisposes to a values system weighted towards narrowly-defined communities. [The same promises to be true of urban societies throughout the world; the wealthier segments of large population centres everywhere betray a like philosophical bent to an extent that rural settlements don't. And something over half the global population already lives in cities, with estimates rising to around two-thirds by mid-century.[41]]

It's not that tribal people are inherently more altruistic than Westerners; it's that in a world where conformity and compliance with traditional values reign, self-interest and 'other-interest' run to convergence. Not so for the Westerner, raised since Descartes and the blossoming of the scientific revolution to be self-actualising and independent: their culture breeds divergence. But back to our protagonists: can we, from those bare bones, infer anything at all regarding a Fred decision?

Commencing with Tribal Fred and Joe, it's practically a given they'd know each other. For that matter, they'd presumptively have some sort of continuing relationship in time and space. After, all they'd both reside in the same, bounded tribal lands and may have ties of kinship and reciprocity—bonds that, in addition to imposing rights and obligations could bear on opportunities for direct interaction. All said and done, we can be tolerably confident Fred won't be unaffected by the knowledge there could be backwash from this incident with Joe. He'd weigh up the prospect of role reversal (that his chickens would come home to roost). He'd also be very much aware that the decision he's about to make could chart the future course of give-and-take within the circles to which he and Joe belong. Compounding this, gestures may count for more than their intrinsic worth: today's assignment of a coveted but non-essential item could impinge on personal business as consequential as clan intermarriage. In the extreme, the stakes could be life or death: the ill-feeling generated by a past decision could distort food-sharing arrangements in times of scarcity or come between members of a hunting party, causing one to lose sight of the onus on each to be at all times alert to the safety of others.

As it would be evident to both Fred and Joe that the former's choice, although insignificant from our viewpoint, could reverberate well beyond the here and now, Fred would think twice before coming down in his own favour. It follows that, if he were to give the bag to Joe, we couldn't surmise altruism. That's disallowed by the degree of (extended) mutual dependence posited; as long as Fred can ill-afford to neglect Joe's interests, long-term self-interest—quite as much as other-interest—could be at the root of a decision to not withhold.

Little though that might seem, it exceeds by a long shot what we could figure out from a Western analogy. In the event that a plastic bag were to be an object of envy in the West, those vying for it could be total strangers, persons who doubted their paths would ever intersect again and would have only appearance, voice, demeanour, etc. by which to gauge congeniality. Although similar mechanisms of cross-variable influence would be operative, the average value of Proximity would be lower for our randomly-paired Western city-dwellers. The most we could deduce is that Western Fred and Joe are less likely than their Tribal opposite numbers to find themselves in decision-making circumstances that give pause to reflect whether self- and other-interest might not converge.

Recapping, to take Proximity on board is to conclude that in a Tribal setting it would, for the most part, serve Fred well to think carefully about Joe's as well as his own interests. Since the smallest decisions would be made in light of a web of relationships understood to embrace the group in its entirety (and heaps more besides), it would be second nature to factor in maintenance and fortification of the web as a whole. Feedback loops would countervail any urge towards personal, short-term satisfaction. In the Western urban context, mobility and diversity make sensibility of linkages patchier. The fact of interconnectedness stands but awareness of some links may be to the virtual exclusion of others, especially those between us and more distant times and spaces. The social bias would then be towards individualism, a narrower present and choice favouring self-interest (actual or perceived). [It's a paradox that Adam Smith's invisible hand should be more readily observed at work in hunter-gatherer societies than in nations which have 'developed' by actively pursuing the freedom of operation he hypothesised would maximise benefit to all.]

Believe me, I'm not panning large cities (nor am I oblivious to the existence of tight-knit sub-communities within them). Their fluidity and multifariousness can be incredibly exciting and, if life in cosmopolitan surroundings is entered into with empathy, it offers exposure to cultures and systems that should facilitate co-operative solutions. [Growing participation by some of the world's largest cities in debates over climate change and terrorism is testimony to that affirmation. Could this presage a more tribal orientation by their denizens? Communications technology would be central to the shift—unravelling one more contradiction of life today, that although we in the West are better 'connected' than any other human society in history, we're short on connectedness.]

Through Proximity, I've tried to demonstrate how a cluster of key contextual variables is critically implicated in our evaluation of the interests of another relative to our own. The less the impression of distance as encapsulated by Proximity, the more we're likely to perceive a strong connection between self and other—to the point where our concern for the welfare of the other may be as for ourselves. But if we lack any real sense of connection—as many of us doubtless do when those who will bear the brunt of our decisions are future generations of anonymous others on the opposite side of the world—well … out of sight, out of mind.

That is, when Proximity is low, normal ability to empathise may not suffice for us to get past unfamiliarity. And if we experience the latter as separateness, any empathic impulse could be stifled. But without empathy as an emotional counter-weight to the reasoned in decision making, outcomes are unlikely to be wise; facts can go only so far towards substituting for empathy and familiarity—especially when outcomes aren't quantifiable.

1.5 Empathy and information

It's a truism that 'full information' is a non-existent commodity. But in complex situations, even sufficient amounts may be rare (and correspondingly pricey). And in others, such as climate change mitigation, where the best human minds are hard-pressed to fully comprehend and account (rationally or otherwise) for their ramifications, sufficiency itself is an unknown. That compels decision makers to optimise a trade-off between the cost of each data increment and the (perchance more widely distributed) benefit it could bestow.

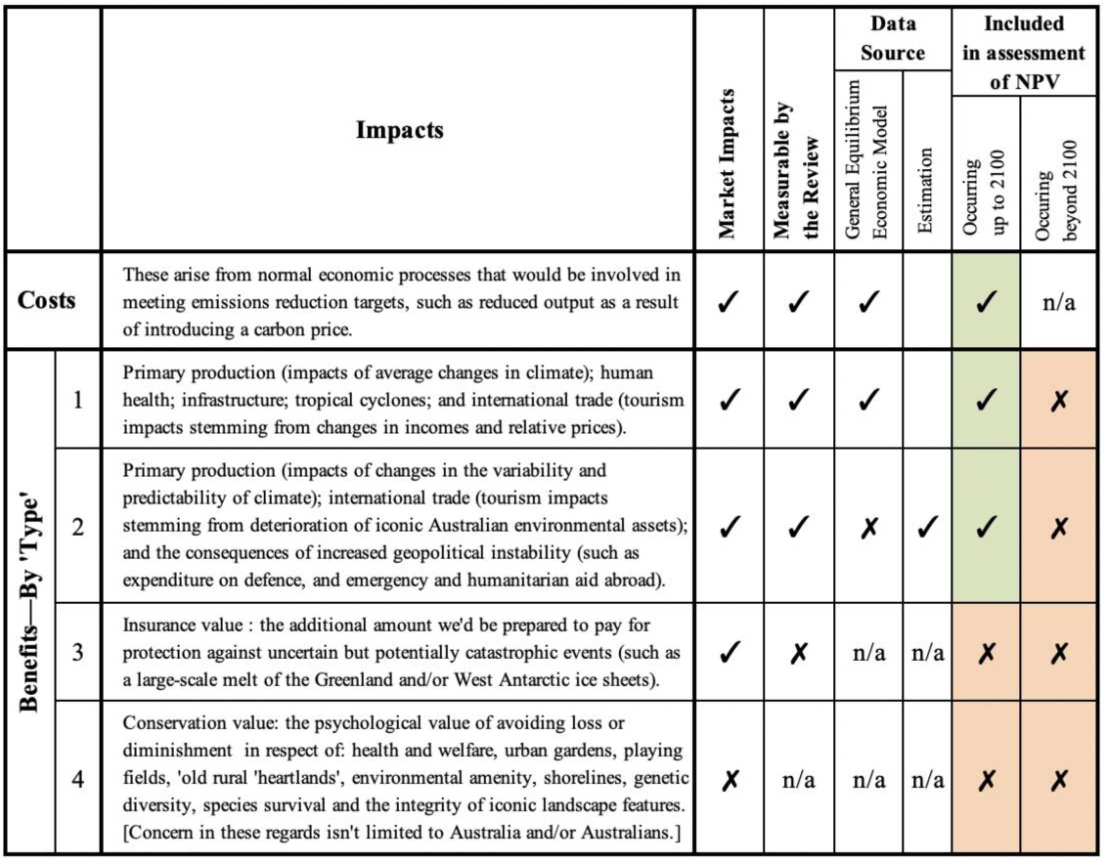
Both costs and benefits would turn on the compass of the issue: many people, large areas and lengthy time horizons can throw up formidable informational and communications challenges. [For Matthieu Ricard, one of the main challenges of our times is to reconcile three time-scales: the short term of the economy, the midterm of the quality of life and the long term of the environment.[42]] And the more cost constrains inclusivity (removes strands in the web connecting ultimate decision makers to ultimate impact bearers), the less Proximity has an opportunity to reveal the existence of hidden synergistic potentialities, and the more the scope for ignorance, misunderstanding and conflict grows.

Most major decisions with a reach much beyond the personal sphere must be considered less than fully-informed. However, this isn't a reference to issues of data adequacy (the limits to what can be known and what constitutes sufficiency in inclusiveness): decisions regarding implementation may fail to accurately mirror, and fairly balance, conflicting mentalities and competing interests.[43] It's a question of ensuring comparability *between different parties and types of information*.

To understand the people aspect of the comparability problem, assume a situation so undemanding that all the 'facts of the matter' were knowable and sufficed for its assessment (that non-reasoned cognitive processes could add nothing). Still you'd not be in a position to avow fully informed and objective decision making unless able to ascertain that those facts had been equally available to, and cognitively accessible by, all parties to a decision—to all ways of knowing and all types of mind.

The information aspect amounts to the old apples and oranges issue. Techniques such as Cost Benefit Analysis are fine when you're comparing like with like. Or if you aren't, when you can establish relative values, quantify unlike elements by reference to a common standard or unit of exchange value (banknotes, salt, gold). However, there may be no single unit of measurement permitting meaningful comparison of tangible and intangible outcomes; intangibles can't be reduced to a monetary standard, can't be quantified at all. The problem of comparability then becomes that of what may transpire when those who aren't 'Proximates' to unquantifiable or hard to quantify outcomes—who are less at the mercy of empathy failure's outturns—are charged with determining whether they occur. If decision makers lack empathic understanding they may have little compunction in leaving such 'non-economic' factors to be implicitly accounted for by the action of quantitative techniques (such as discount rates) designed to deal with 'economic' factors or omitted from calculations. We need look no further than climate change for an embodiment of the problem: mitigation would be less contentious were it not for unquantifiables.

Figure 1 relates. Constructed using information obtained from Ross Garnaut's 2008 Climate Change Review for the Australian Government, it summarises the types of impact investigated in carrying out scenario analysis of the Government's options. Those were to mitigate or not-mitigate and, if the former, which of two levels of emissions reduction to target. [44]



		Impacts	Market Impacts	Measurable by the Review	Data Source		Included in assessment of NPV	
					General Equilibrium Economic Model	Estimation	Occurring up to 2100	Occuring beyond 2100
Costs		These arise from normal economic processes that would be involved in meeting emissions reduction targets, such as reduced output as a result of introducing a carbon price.	✓	✓	✓		✓	n/a
Benefits—By 'Type'	1	Primary production (impacts of average changes in climate); human health; infrastructure; tropical cyclones; and international trade (tourism impacts stemming from changes in incomes and relative prices).	✓	✓	✓		✓	✗
	2	Primary production (impacts of changes in the variability and predictability of climate); international trade (tourism impacts stemming from deterioration of iconic Australian environmental assets); and the consequences of increased geopolitical instability (such as expenditure on defence, and emergency and humanitarian aid abroad).	✓	✓	✗	✓	✓	✗
	3	Insurance value : the additional amount we'd be prepared to pay for protection against uncertain but potentially catastrophic events (such as a large-scale melt of the Greenland and/or West Antarctic ice sheets).	✓	✗	n/a	n/a	✗	✗
	4	Conservation value: the psychological value of avoiding loss or diminishment in respect of: health and welfare, urban gardens, playing fields, 'old rural 'heartlands', environmental amenity, shorelines, genetic diversity, species survival and the integrity of iconic landscape features. [Concern in these regards isn't limited to Australia and/or Australians.]	✗	n/a	n/a	n/a	✗	✗

Figure 1—Measurement of Costs and Benefits

['N/a': Costs, 'not applicable'; Benefits, 'not available'. NPV: Net Present Value]

For analytical purposes, Garnaut defined Costs as the Australian portion of the global burden associated with global action to reduce global emissions to target levels. Less intuitively, Benefits were measured as the difference between the Costs imposed on Australia by mitigation (at each target level analysed) and those the country would face if no global mitigative action should be undertaken—that is, as the 'Avoided Costs' of unmitigated climate change. The figure brings into sharp relief a quantification asymmetry. For a large number of very significant Benefits, the Review could do no more than essay an estimate of loss/gain. Quantification appears not, however, to have been an insurmountable obstacle for Costs. That's because, while Costs would be largely borne in this century, many of the anticipated Benefits (the bulk?) would accrue in the next two—remote from the timeframe within which the quantitative techniques employed were capable of producing reliable solutions.

Having completed his analysis, Garnaut concluded it didn't appear to be in Australia's best interests to encourage global mitigation action: 'no-mitigation' would cost the country less than participation in a co-operative effort to reduce global greenhouse gas emissions (Carbon dioxide-equivalent, CO_2-e) to either of the levels analysed.

His implicit savings are tabled in Figure 2.[45] To bring perspective, Garnaut expressed savings as percentages of the Present Value (PV) of no-mitigation, 21st century Australian Gross National Product (GNP). Accordingly, the main numbers (shaded green) are the percentage of discounted 21st century GNP that would be saved by choosing the no-mitigation option over the relevant DR-mitigation target pairings.

Emissions (CO2-e) Reduction Scenario (ERS)	**Discount Rate (DR)**			
	1.35%	2.65%	Difference attributable to DR	
			(pps)	(ppn)
550 ppm	3.2	3.3	0.1	3%
450 ppm	4.0	4.2	0.2	5%
Difference attributable to ERS: - In percentage points (pps) - Proportionately (ppn)	 0.8 20%	 0.9 21%		

Figure 2—Savings to the Year 2100

There are three main points to note.

- Discounting at either rate, there's a saving to no-mitigation whether it's compared with the 550 or the 450 ppm ERS.
- The heaviest loss would be 4.2% of GNP—with mitigation to 450 ppm and a DR of 2.65%.
- Mitigation to the less strict target of 550 ppm would reduce that loss by around a fifth—save 0.8 to 0.9 percentage points of GNP.

You'll recall, however, that these calculations include all Costs but exclude most Type 1 and Type 2 Benefits (that part of them expected to occur in the post-21st century future) plus all anticipated Type 3 and 4 Benefits. Garnaut felt the latter were likely to be extremely high by the end of the 21st century, especially under the 450 ppm-scenario. If mitigation investment decisions are to be transparent, somehow, the excluded Benefits had to be brought into account. The problem was handled in the only way it could be, by setting the calculated savings to approval of a 'no mitigation' strategy as a benchmark against which to measure omitted Benefits, as "an indication of the amount Australia would need to pay to have access to the *additional* benefits of climate change mitigation" for Australians—in these and future times. The advice to be tendered thus came down to whether the savings shown validated sacrifice of the omitted Benefits. Garnaut made no bones about his belief that they didn't—that the cost of mitigation was worthwhile, even the higher cost of mitigation to 450 ppm.

Rendering comparable impacts occurring on exceedingly different timescales is likely to embroil decision makers in *subjective* comparisons between what is and what may be. Garnaut also left no room for doubt that, in his opinion, this subjectivity made climate change policy a normative matter, alleging that the challenge of adapting to it in this century would be as nothing compared with the task facing people in future times should we fail to put in place effective global mitigation strategies.

Climate change mitigation is about as complicated as fixing on a 'triple bottom line' middle ground gets but it's never going to be easy so we shouldn't be astonished if organisations discount some operational effects. In evaluating attributes, profit-based entities go by their impact on indicators of corporate performance (revenue, market share, etc.); if an impact can't be measured the attribute will be underrated. What of Governments? In principle, they have a broad mandate. Does that mean we can expect them to intervene when it appears that private sector decisions might lead to unsustainable outcomes? No. Their mandates are bounded by political systems and subject to implementation by sometimes competitive, always fallible, individuals. That limits what can be realistically expected of them.

There's no refuting it. We're going to have to learn to live with disagreement over what constitutes sustainability; a plan may be deemed 'bad' (unsustainable) by those who'll be subject to it, 'good' (sustainable) by those tasked with its execution. That would pose an ethical dilemma unless we could be assured those with the greatest power would also exhibit the greatest empathy. As it stands, the one thing of which we can be certain is that governments can no more escape making value judgements than any other decision maker.

One group of immeasurable assets that's particularly susceptible to adverse outcomes if empathy should lack or be subordinated when subjective comparisons are made is 'ecosystem goods and services'. That expression refers to attributes of the natural environment from whose impoverishment we would suffer yet customarily ignore in evaluating wealth. Depending on the system studied, the list of identifiable benefits to humanity might include: production of oxygen; water purification; provision of gene bank, flood alleviation and carbon sink services; medicinal compounds; fish nurseries; psychic amenity; cultural inputs and more. Plainly, it would be nigh on impossible to assess the full worth of systems with such attributes.

Otherwise put, naturally occurring features of our world such as old growth forests, river systems, coral reefs and swamps are truly invaluable assets. Amongst our Tribal friends, there'd be unspoken cognisance of this fact; in the West, nature may be at such a remove that we're all but oblivious to the contribution ecosystems make to our wellbeing (hence our treatment of the ocean as a dumping ground, a place where discarded plastic bags can go and die).[46]

That has to change. As we battle to raise global living standards to acceptable levels, we sometimes act as though we believe that half the players on the team will have become dispensable long before that goal is met—as if technology will make the natural environment redundant. But future generations may see things other than as we do. They'll possess an expanded body of knowledge and live in what could be an unimaginably altered world—one of our making: value is relative to both scarcity and desire, neither of which are immutable. As Garnaut reminded us, climate change may cause some high-quality natural assets to become scarcer. At the same time, it's held, the value we attach to a given level of availability of natural (and socio-cultural) assets increases with the extent to which our need for food, water, love and shelter (life's basics) is met. The worry is that the very much higher value we may one day come to place on immeasurables will echo attainment of (measurable) 'living standard' ambitions plus the rarity of natural systems. Precisely those decisions which enabled us to meet our basic needs will have diminished the ability of natural systems to provide what we're then seeking—what would then add most to utility. [That may make me appear to be unduly focused on 'nature'. I don't believe I am: nature supports nurture; our nurture of nature will be the difference maker to the quality of life globally in all its forms.]

We mustn't allow that to happen: it's you and I who elect and form governments and administrations, who must become more other-oriented—more mindful of the interests of others when deciding. Future others are peculiarly vulnerable: powerless as they are to exert pressure on us, they are amongst those who'll be most affected by our decisions. We can't foresee how history will appraise our decisions when variation in asset identification and evaluation is indeterminable. What we can be certain of is that in an uncertain world our descendants will value choice. And empathy is our insurance against them being left with no choice; that's the case for co-operation over competition—for shared responsibility.

1.6 Power sharing

Conceptually, collective responsibility can't be reconciled with traditional, pyramidal power structures. It's required to cope with complexity and uncertainty, with conflicting priorities and externally-imposed bounds (absolute as to what can be known, pragmatic when it comes to inclusivity) and presupposes both diversification of power bases and a greater measure of power sharing. That tells us progress is liable to be a slow and bumpy ride.

We're talking about compromise, which often requires a willingness to relinquish power; not something a currently powerful individual is likely to want to hear. Being able to assert oneself—if only in small ways, so long as they're meaningful—is essential to wellbeing, connoting a measure of independence. What must it be like then to have a controlling influence over decisions that could change the world! It's been said that absolute power corrupts absolutely. Notwithstanding that functioning democracies forestall a complete loss of integrity, realism bids us acknowledge the risk of addiction amongst those who exercise great power in any domain; the accompanying sense of superiority and entitlement can blind to the greater good.

Reluctance to be moderated isn’t the only factor inhibiting more distributed decision making, and if we dwell on it we may overlook others that can be implicated when the exercise of power errs into murky waters. There’s more mileage in appreciation of practical problems that come with the territory.

Think of power sharing as the most extended form of collaboration or consultation. What’s intended by ‘consultation’ varies between contexts. At one extreme, it may be used when the flow of advice is, in actuality, unidirectional; there’s no listening worthy of the name by top echelons. At the other, you have empowerment, decision making as a shared responsibility; there’s a full, open, two-way exchange of information and readiness to compromise. This may be consultation as a tactical manoeuvre, a stepping stone to a wider pool of skill and knowledge. Still, more large bureaucracies than we might credit could harbour a philosophical inclination towards the inclusive end of that range but baulk at the practicalities of effectuation. There are the logistics of providing opportunities for all opinions to be aired, all sources of information canvassed, and the socio-psychological teaser of assuring that people will be prepared and able to speak their mind when they’ve an opportunity to do so.

These are reasons for hesitation, not excuses. Greater inclusivity of decision making is a matter of necessity, not discretion: the by-products of enviable living standards go way beyond anything from earlier, simpler, less materially prosperous periods and could be devastating—are unsustainable. Nor are they insuperable obstacles; we can surmount them. It will take solutions directed at the root cause: a system of social, economic and political organisation that, in omitting to foster empathic ability, militates against inclusivity.

In a democracy, you can’t change the system overnight. You can, however, set an example by encouraging participation in activities that could right the EQ/IQ imbalance within your sphere of activity.

I began this chapter by introducing an hypothesis: that through nature-nurture and society-technology feedback loops, our choices in the food sector could both create difficulties and corrupt the underpinnings of our cognitive competence to cope with them. Should such a calamity befall us, the prospects would be bleak for solution through linear, highly specialised approaches (cognitive or managerial) by small groups of decision makers. When dealing with multifaceted, interrelated issues like food and climate change, the requirement is both narrower and broader. All choices are made by individuals; the trouble is, these are areas in which we often seem oblivious to the spillover from our own choices (minor as well as major). From one point of view, that’s unsurprising: a chasm—spatial, social and/or temporal—may divide decisions and their aftermaths. If we are neither personally endangered by the flow-on effects of our choices, nor in a position to observe their repercussions for others/the environment, there’s no incitement—selfish or altruistic—to change. Moreover, the bigger the gap the harder it is to conquer our human bias towards the here-and-now. In consequence, side-effects (good, bad and indifferent) accumulate.

Once, we could claim ignorance. No longer. The centuries of technological development which have brought us to this pass also equipped us to assess it; we are no longer unaware of either cause or effect. It matters little that the delayed and/or displaced costs of our lifestyles are unintended. Each of us must behave in such a way that we would, if transported to the future, have no qualms about living with, or being held accountable for, the legacies of our choices; globally, they must be reconcilable with sustainability.

Put simply, sustainability is unrealisable without local acceptance of responsibility, global coordination of action. It therefore rides on management of diversity, on our ability to harness all humanity's mental attributes. If we're to become more adept at that, we'll have to correct our lop-sided orientation, gain deeper expertise in EQ skills—bolster our aptitude to personally work as well with subjectively- as objectively-derived information. Success—re-integrated and balanced reason and emotion—could usher in a new age, one in which we overthrow unwittingly self-imposed notions of non-existent separateness between EQ and IQ. In the wake of their integration other rifts would heal—between: social, economic and environmental; here and there; now and then; us and them; nature and nurture.

An 'Age of Integration' would be t stamped by collaboration in 're-cognition' of interconnectedness and the value to decision making of all types of mind. If that Age is to come to pass, reason itself tells us its own dominance will have to end, that it alone can engineer integration. In an endeavour of the ilk, reason is apt to be its own worst enemy; IQ and EQ are such disparate qualities that using one (our dominant ability at that) to revitalise the other—reasoning ways to lessen reason's hold over us—cannot but be problematic. However, knowing that is half the battle.

It comes down to machine-human complementarity. Fast data-processing and slower decision making. For the quantitative load to be left to IT and humans spared for qualitative assessment, to review the data with empathic eyes—to do it justice. What's wanted is that we should dedicate a tidy portion of the time machines can save us to creating room for processes which enlist mental faculties other than reason, and capitalise on the broader knowledge and experience that comes with a more varied decision-making group. Where there's incertitude we can't count on rational knowledge, and time spent cultivating its emotional complement is investment in human capital.

Learning to paint with the full palette of human mental colours will force the creation of techniques that can do for our emotion-processing ability what 'Deep Learning' has done for rational processing capability.[47] What it's been able to achieve testifies to the rewards from investment in IQ. Now it's time to invest more (more money, more time, more of everything) in EQ. The current investment ratio— machine learning to human wisdom—can't build the capacity it will take to bear the burden we've made of our planetary remit.

In closing Part One, I freely admit there'll have been next to no terrain in it not already covered elsewhere. The intent behind re-traversal was to establish a common (if not agreed) perception of the need for change and the general direction in which to seek it. With the problem posed, Part Two proposes a solution.

From our original cerebral complement arose language, which gave voice to reason, and music, aka the language of the emotions.[48] Long ago, language and music merged in one of the best-loved, most nearly planetary manifestations of culture: song. Group Song, I'll argue, is a technology which deserves a share of the recommended investment. It can provide the boost to *qualitative* processing capacity which comes with easier access to the contents of the subjective mind. It can do that and more: help bridge the inter- and intra-individual divides which are the main impediments to concerted action on so many global issues. Part Two takes up that thread, articulating the genesis and structure of my argument for Song, Group Song, as a tool of integrated decision making—a sustainable solution to unsustainability.

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[1] 'Wicked' is here used in the sense of a 'wicked problem', a phrase which refers to problems that are "difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize". "Moreover, because of complex interdependencies, the effort to solve one aspect of a wicked problem may reveal or create other problems." Wikipedia, Wicked Problems.

[2] Globally, soil, air and water quality are under threat from, for example: side-effects of industrial agricultural methods (monoculture, 'over-cropping', and reliance on pesticides, herbicides and synthetic fertilisers); animal husbandry practices (growth hormones, antibiotics and potentially contaminated feeds such as 'meat and bone meal', MBM). Sub-standard treatment of food animals may also be prejudicial to human health. Excessive food processing may: leach minerals, destroy vitamins and enzymes, denature protein, remove fibre, oxidise fats and/or involve the addition of artificial colourings, flavourings and preservatives. Food and beverage packaging makes extensive use of plasticisers such as Bisphenol A, an identified Endocrine Disrupting Chemical (EDC).

[3] In asserting our problem-solving faculties could be under fire, I've offered a worst-case scenario but the more I learn about epigenetics the less immoderate it appears. That is, a growing number of medical professionals seem to agree that complex, multifactorial pathologies—such as obesity, diabetes, cardiovascular disease and cancers—which can lead to intellectual/cognitive disability, are attributable to the interaction of multiple genes and genomic pathways as well as lifestyle and environmental factors.

[4] IQ stands for 'Intelligence Quotient', EQ for its emotional equivalent, 'Emotional Intelligence'. Daniel Goleman brought the latter term to prominence as representative of characteristics essential to personal, interpersonal or social acuity that are distinct from the intellectual attributes captured by IQ.. In his view, EQ is a better predictor of 'success' than IQ; you can have a Mensa-level IQ but if you don't know how to relate to people in a way that keeps them onside and gets your point across, you'll go nowhere. [Goleman D, *Emotional Intelligence: Why it can matter more than IQ,* London, Bloomsbury Publishing Plc, 1996.] However, while we know how IQ is measured (it's the ratio of a person's mental age to their chronological age, multiplied by 100) what it measures remains unclear. Steven Pinker [*How the mind works,* London, Penguin, 1999] considers it a crude indicator of rational human thought.

It will be evident that I employ IQ and EQ in another sense, as shorthand for capabilities and modes of comprehension which I associate with them.

[5] Silberman S, *Neuro Tribes; The Legacy of Autism and how to Think Smarter about People who Think Differently,* NSW, Allen and Unwin, 2015.

[6] Silberman, *Neuro Tribes,* op. cit.

[7] Tanja Dreher, ARC Future Fellow, University of Wollongong, guest of Antony Funnell, *Listening and Responding*, Future Tense, ABC Radio National, 28 June 2015.

[8] On 13 February 2008, Australia's then-Prime Minister, Kevin Rudd, made a formal apology to Australian Aborigines for the multiple ways they'd been mistreated since colonisation.

[9] Goleman, *Emotional Intelligence; Why it can matter more than IQ*, op. cit.

[10] Goleman cites research showing that when attempting to read the other's feelings, husbands and wives demonstrated the greatest accuracy when their physiology tracked that of the spouse they were watching. Goleman, *Emotional Intelligence; Why it can matter more than IQ*, op. cit.

[11] Daniel Goleman, *Working with Emotional Intelligence*, London: Bloomsbury Publishing Plc, 1998.

[12] Goleman, *Emotional Intelligence; Why it can matter more than IQ*, op. cit.

[13] Adam Grant, *The lost art of listening*, TED Ideas, 3 February 2021.

[14] Damasio, *The Feeling of What Happens*, op. cit.

[15] Goleman, *Emotional Intelligence; Why it can matter more than IQ*, op. cit., referencing Damasio A, *Descartes Error: Emotion, Reason and the Human Brain*, New York, Grosset/Putnam, 1994).

[16] Duncan S, and Feldman Barrett L, *Affect Is a Form of Cognition: A Neurobiological Analysis*. *Cognition & emotion* 21.6 (2007): 1184–1211. Paraphrasing based on Wikipedia's definitions of 'affect' and 'cognition' in psychology.

[17] Lisa Feldman Barrett, *You aren't at the mercy of your emotions—your brain creates them*, TED@IBM, January 2018.

[18] In a similar vein, Anil Seth presents perception as an active, constructive experience. Anil Seth, *Your brain hallucinates your conscious reality*, TED2017, April 2017.

[19] Kathryn Schulz, *On being wrong*, TED2011, March 2011.

[20] Sigman and Ariely note that group discussion and debate lead to better decisions because it removes the outliers to arrive at a "robust average". Mariano Sigman and Dan Ariely, *How can groups make good decisions?*, TED Studio, April 2017.

[21] Techniques instanced by Bryan include: scenario planning, war gaming and those that make use of, for example, decision trees and probability calculations.

[22] Worse still, a number of studies have shown that psychopaths are over-represented (relative to their incidence in the general population) in the higher echelons of large organisations. The competition inherent in many (if not all) hierarchical organisations is, doubtless, one in which psychopaths would thrive.

[23] Included amongst the techniques listed towards the start of this section were possible exceptions to those criticisms. For instance, mind-mapping is equally likely to be a solo or group activity, while the practice of 'mindfulness' is predominantly a private matter. Moreover, mindfulness, once adopted, tends to be engaged in with some regularity, which also allows of it having a lasting effect.

[24] The frequent, intermittent distraction provoked by addiction to email and social media can also disrupt focus—and, in children, make it difficult to learn to remain focused. That could have even more serious developmental consequences for IQ than for EQ.

[25] Goleman, *Emotional Intelligence; Why it can matter more than IQ*, op. cit.

[26] *Oxytocin*, an interview with Dr Marc Lewis, Catalyst, ABC TV, 9 February 2016.

[27] Occasionally, digital communication is the only avenue open for necessary or desirable connections. I have to admit, though, that only relatively recently have I started to really appreciate the significance of the digital divide myself. [See: Mathias Jud, *Art that lets you talk back to NSA spies*, TEDGlobal>London, September 2015.] However, that realisation hasn't served to lessen my emphasis on the value of face-to-face communication; it's strengthened my view of complementarity.

[28] Jon Ronson, *When online shaming spirals out of control*, TEDGlobal, London, January 2015.

[29] Wael Ghonim, *Lets design social media that drives real change*, TEDGlobal, Geneva, December 2015.

[30] *Understanding internet trolls,* The Science Show (with Robyn Williams), ABC Radio National, 27 March 2021. The research in question was conducted by William's guest, Dr Evita March.

[31] Oscar Schwartz, *Can a computer write poetry?*, TEDxYouth, Sydney, May 2015.

[32] In so far as the reverse holds, the analogy might rapidly shift from a single looking glass to a house of mirrors, with its endlessly repeating, highly disturbing reflections!

[33] From notes jotted down while listening to an ABC Radio National programme some time in 2018.

[34] Sam Harris, *Can we build AI without losing control over it?*, TEDSummit, June 2016.

[35] I refer to three TED Talks, given (on completely separate occasions) by: Mukherjee, on the future of medicine; Cottam, on solving social problems; and Russell, on reform needed in law enforcement. Siddhartha Mukherjee, *Soon we'll cure diseases with a cell, not a pill,* TED2015, March 2015; Hilary Cottam, *Social systems are broken. Here's how to fix them,* TEDGlobal, London, September 2015; and Melvin Russell, *I love being a police officer, but we need reform,* TEDxMidAtlantic, September 2015.

[36] Mukherjee op. cit.

[37] Mukherjee emphasised the need to ensure that relationships are woven into the fabric of problem solving. Solution: grow something (work with the body's own mechanisms) rather than kill something (viruses, tumour cells, etc.). Cottam spoke of their power to solve deep and complex problems. Solution: redesign simple, human relationships into the welfare model. Russell's focus was 'relational equity'. Solution: think holistically, not militarily.

[38] Zeynep Tufekci, *How the Internet has made social change easy to organize, hard to win.* TEDGlobal 2014, October 2014.

[39] Damasio, *The Feeling of What Happens*, op. cit.

[40] As soon as I'd typed those words, several examples came to mind that seemed to invalidate this equivalence. If we belong to a minority ethnic group, we may register a higher degree of Social Proximity for our co-nationals in other countries than for our near neighbours and fellow citizens. If we have no descendants ourselves, we may feel less concern for future

generations; the same relative distance in chronological time might produce different perceptions of Temporal Proximity. And it's a truism that people don't always feel close to their blood relatives but may develop an instant sense of affinity with a total stranger. However, to incorporate these exceptions it's only necessary to specify that individuals may 'weight' the sub-variables differently.

[41] Robert Muggah and Colleen Thouez, *Opinion: Why the actions of cities—not nations—will be the key to our survival on earth*, TED Ideas, January 2018.

[42] Matthieu Ricard, *How to let altruism be your guide*, TEDGlobal 2014, October 2014.

[43] "There are known knowns. These are things that we know we know. There are known unknowns. That is to say, there are things that we know we don't know. But there are also unknown unknowns. These are things we don't know we don't know." Donald Rumsfield (American Politician). Source: "Donald Rumsfeld." BrainyQuote.com. Xplore Inc, 2015. 3 January 2015.

[44] Garnaut R, *The Garnaut Climate Change Review; Final Report,* Cambridge University Press, Melbourne, 2008.

[45] Data sourced from Garnaut R, 2008, op. cit., Table 11.3.

[46] If the indigenous inhabitants of an area nevertheless consent to a project that will degrade their natural environment that may simply be because: they're daily exposed to the material abundance of the 'developed' world without being able to share in it; and are no better equipped than we are to arrive at an objective NPV for the choice facing them (consent or continue to do without).

[47] Deep learning was inspired by the way the human brain works. That is, as machine learning improves a computer's performance at intellectual activities, so it increases the machine's own ability to build other computers that are even more intellectually capable … and so on, potentially ad infinitum.

[48] Goleman tells us that: "Just as the mode of the rational mind is words, the mode of the emotions is non-verbal." Goleman, *Emotional Intelligence,* op. cit. From there, it's a short step to refer to music as the language of the emotions. But while I believe the sentiment behind that expression to be universally true, I'm hesitant to speak of music as a universal language since we all interpret it in different ways—and have our preferences (a piece that drives one person mad may be another's favourite).

Part Two:

The Solution Proposed

2

Song and the Emotions

At a loss how to lance Part Two, I paced, mind wandering and lured outdoors by a perfect May-in-the-Bay day: cloudless blue sky, multi-hued waters shimmering in the distance and blissful stillness. All too soon the Southerly would return, its noisy, restless, insistent presence setting nerves on edge. Right now, it was windless: no blinds flapping, no pink dust insinuating itself into every nook and cranny—and nothing to drown the voices of my avian callers. As I listened to the raucous chatter of crows asserting pecking-order rights at the water-bowl, and intermittent, melodious bursts of conversation between honeyeaters in a nearby shrub, I detected movement close at hand and an emu rounded the corner of the fence.

Further South, in the West Australian 'wheatbelt', these big birds may, during droughts, descend on farms in plague proportions. Where I live, it's too arid for agriculture and many locals, not to mention tourists, enjoy their visits immensely. Watching my visitor, I realised I'd never heard an emu utter a sound—not squawk, not chatter and definitely not sing. That was about to change: rapid, high-pitched chirruping alternated with a deep, loud and sustained 'burping' as chicks searched frantically, and the adult bird answered reassuringly, till all eleven of its straggling brood were safely reunited with it … with Dad.[1]

You see emus disdain conformity to sex and role marker standards. Take for instance a few of the orthodox guides: relative size and flamboyancy, and parental duties. Amongst emus, the female is as large as the male and slightly showier: her blue neck skin is darker and it's she that grows nuptial plumage (does the luring). It's also she who may become aggressive should the male rush courting, he who incubates her clutch, leads the chicks to food and fresh water, and envelops them with his feathers at night—all of this for up to eighteen months.

Chirruping and burping: call and response—communication. Although I'd eavesdropped on that emu family's conversation, like as not the chicks heard a good deal more than I did. Dad's reply to their calls may have contained sounds too low for human ears to register, waves too long and slow to be transmitted through air but which can travel through the ground. These could have been picked up by the chicks' sensitive feet and conducted by nerves to their inner ears. An ability to pick up 'underground' or 'infrasonic' wavelengths would have enabled them to establish Dad's location with greater accuracy than I could have using aurally-garnered sound-waves alone. [Low-frequency sound-waves can travel great distances in the denser media constituted by earth and water. Elephants are known to make long-range communications use of their capacity to generate these vibrations: they adjust their orientation and 'triangulate', one foot balanced on tip-toe, to locate the point source of acoustic waves transmitted by others of their species, signals that could be coming from up to ten miles (sixteen kilometres) away.[2] And whales are thought to exploit the conductive properties of ocean thermal gradients to transmit their calls over a hundred times that distance. (Noise pollution from shipping, military sonar activity and leisure boats may have shrunk their acoustic range by as much as 90%.[3])]

From mulling over the short- and long-range communications of other animals I drifted to human information interchange. For us as for them (I take it), signal interpretation—the ascription of meaning or significance—is more learned behaviour than a mindless, genetically-encoded reaction to sense stimuli. However, we communicate via a hybrid of innate ability and technology. This invests us with unbelievable range, but absent from much of our communication is auditory and/or visual information we‘ve evolved to rely on.[4] When recognising, interpreting and responding to that non-verbal input, EQ abilities are paramount and their maturation is utterly reliant on it. By inference, what declines when it does is the capacity to understand values and motives which are unexpressed and/or born of the emotions. Whilst electronic communication can be empowering of innately dissimilar minds, the reduction in face-to-face and/or ear-to-ear contact that comes with it stands in stark contrast to the communication demands of diversity.

To learn to communicate well with non-identical others (whether one-on-one or in groups, remotely or up close and personal) is to learn how to take advantage of the emotions we and they are capable of feeling and stirring—or, to rephrase, how to extend and upgrade non-linear-/pattern-processing capacity. The methods I'm aware of which aspire to teach that are unsatisfactory: since their invocation of non-linearity is fleeting, linearity soon reasserts its sway. If all who'll be party to or touched by the making of a decision are to be comprehensively informed, EQ attributes such as (pattern processing-reliant) affective empathy should be quietly beavering away alongside IQ's (linear processing-dependent) intellectual component of empathy and logic in all stakeholders from the time a project is first mooted. Once it has become an automatic pattern of behaviour to 'un-self', it would be that much harder to unquestioningly subscribe to the logical course (which could see all impacts discounted except those with fairly certain consequences for the decision-making entity itself).

For that to be a pragmatic decision-making outlook, everyone would have to be competent verbal and non-verbal communicators—able to process linearly for semantic content and, simultaneously, pattern-wise for a more penetrating insight.

My mission in Part Two is to convince you that participation in Group Song fits the trainer bill. In this chapter, I'll explain how I came to be convinced of that myself. I'll commence by sketching the rationale behind song-as-solution, then reverse time to narrate something of the lead-up to that reimagining of a cultural form.

2.1 Song as solution—the rationale

The need, as I saw it, was twofold. We had to make fuller use of our empathic response capacity—the richness of perspective and guidance, EQ can supply. Empathising, contemplating the problems and concerns of others, can jerk us out of the settled and monotonous mental routines that don't bode well for creative problem solving. We also had to regain our prehistoric concurrency of linear and pattern-processing—*re-integrate* mental processing—and lift it to the heights attained for conscious reasoning.

My search for change agents began with this postulate, that our best hope lay in the feedback loops between nature and nurture. Nurture able to step up the frequency with which we concurrently utilise reason and the emotions could, through modification of brain architecture and functioning, engender a state of nature which would dispose us to continue with integrative nurture. Sooner or later it would be natural to navigate life in an integrated state of mind; integration would characterise human cognition anew.

Next came criteria. The nurture element of this circuit—the tool chosen—would be efficient and effective, I decided, if it met three criteria. The first is axiomatic: its mental processing demands must be such as to activate EQ in general and empathy centres in particular, without in any wise undermining IQ. Second, verbal language is foundational to logic, and logic to public decision making. Ideally, therefore, the tool would put language into service but not be solely dependent on it. Third, the tool should be available to, and accessible by, all. [NB: Audition may take little or no part in communication for the hearing-impaired and would be matched by touch for the sight-impaired. Nevertheless, given expository restrictions, from here on in, if not specified, ‘language’ stands for the spoken word.]

I could continue in that vein, pretend it led me to ‘the arts’. To be honest, my criteria were reverse engineered: I worked backward to them from song, as a promising contender. Not that I settled on song immediately. Unwilling to proceed on an intuitive footing, I made time to compare it with other areas of the arts, form a view as to whether painting, for example, with its reliance on vision, might not have equal capacity for concurrent activation of EQ and IQ.

With that admission, you might well ask: Why the hunch that song could be the solution? Around the time I came to feel that how we fashion decisions was, in many cases, inimical to sustainability, I heard about the ‘Arts and Sustainability’ movement and I bought a book by William Benzon: *Beethoven’s Anvil; Music in Mind and Culture*.[5]

It’s a fundamental tenet of the Arts and Sustainability movement that knowing action needs to be taken is insufficient to galvanise it; the call to action is really only heeded when the necessity of it is felt. Feeling is the cornerstone of the movement. “In the arts we can explore the texture of difference and explore experiences”—and it’s in an exploratory frame of mind that we’re most inclined to permit ourselves to feel.[6] Which is why testing messages conveyed through the Arts affect us at a deeper, more emotional level, allowing them a moment of access to consciousness that would otherwise be denied by habitual defence.[7] Remembering this, I wondered whether Benzon’s thesis on the evolution of those skills we name ‘music’ and ‘language’ might demystify that emotional responsiveness. With that, my attention veered from organisational structural processes (as the thing about decision-making in direst need of modification) to individual processing styles.

In elaborating on those sources of inspiration, the next two sections may owe more to Benzon than will be apparent: the gist of his thinking on music and language came, over time, to so colour mine as to make full attribution impossible.

2.2 The evolution of music and language

Music and language: the origins of these cultural innovations, along with their interrelation and their causal connection to our physical form, are lost, perhaps irretrievably, in the mists of time. But although certitude lacks, there's no shortage of plausible theories, some dating to the mid-19th century. In the main, theories are distinguished by their stance on music as an evolutionary contributor to the survival of our species: adaptionists believe it is, non-adaptionists don't.

For the cognitive psychologist Steven Pinker, a prominent, recent non-adaptionist, music borrowed the machinery developed for other mental faculties, including language (which he *does* esteem adaptive), and is merely a superfluous, if delightful, technological refinement.[8]

Meanwhile, for adaptionists, music animated evolutionary mechanisms which cast human minds in a mould supportive of musical behaviour.[9] Why? From Darwin's time on it's been proposed music acted as a baseline for biological and sexual fitness. To précis the tenor of the sexual-selection idea (as expounded by Levitin), in parading the physical and mental skills of accomplishment in music and dance, our ancestors would be advertising to prospective mates they had stamina and resources (food and shelter)—the health and wealth to spend time and effort on unproductive activities.[10] Along with that, Levitin muses, reliability and conscientiousness may have been signalled by the mental focus of expert ability, and cognitive flexibility (expedient in hunting) by the creativity in music and dance. Patel remarks that another adaptionist theory has music originating in the "melodious, rhythmic, affect-laden utterances" used by adults to "sooth or arouse pre-linguistic infants"—vocalisations that would have promoted infant survival.[11]

Those theories seem compatible with various suggestions (some from unrelated fields) around the possibility that music, being a complex activity sharing many features of speech, may serve as mental preparation for other complex cognitive and social activities, including language—that it may be a form of play.[12]

Patel himself stands with those who are neither adaptionists nor non-adaptionists. From his reading of the neuroscientific research, music is a human invention "built on diverse, pre-existing brain functions", rather than "any evolutionary-based brain specialization for musical abilities". But if music is (within this framework) non-adaptive, it's potentially "biologically powerful": "musical behaviours (playing, listening) can have lasting effects on non-musical brain functions, such as language and attention, within individual lifetimes."[13]

Germane to my song-tool proposal as it is, at the time the latter was formulated I was as unfamiliar with Patel's as with the other hypotheses noted. What set my direction was Benzon's conception of a 'muso-language' (which I've come to know is consistent with Patel's 'group cohesion' school of adaptionist thought). Below, in condensed form is, what I took from Benzon and how it culminated in my 'side-by-side' position with regard to the evolution of music and language. [14]

In their sensory exploration of the world, vision wasn't always as dominant a modality for our forebears as it is for us today. The fossil record of primate evolution indicates that our distant relatives moved on all fours, noses close to the treasure house of olfactory information that is the ground. At that stage, sense of smell would probably have been as elemental as sense of sight. Gradually, it seems, there was a shift to an arboreal habitat and more upright posture, then bipedalism and colonisation of the plains. As these shifts progressively re-positioned heads further from the ground, snouts shrank and eyes moved inwards, to face forwards. Supposedly, what the nose lost in this process was more than compensated for by what the eyes gained.

The switch to diurnal activity and greater reliance on flowering plants for food, as well as the new vistas height unfolded, would have brought new visual stimuli. [Plant-gathering in daylight hours would have benefitted the ability to perceive a bigger range of electromagnetic stimuli (from a finer sense of colour perception) and is thought to have stimulated development of trichromatic vision. Expansion of the field of vision is believed to have triggered selection for improved binocular vision (stereopsis) to the point where depth perception evolved. With that came a whole new way of seeing the world.][15] But if the habitats now accessible to our ancestors presented new opportunities, they'd also have necessitated new solutions in workaday areas—food and water, shelter and security—that could have acted as a catalyst to music and language.

Chances are that produce suitable for gathering was more widely dispersed on the plains than in a forest environment; this may have forced plains-people to hunt more—and indubitably would have increased the risk of the hunter becoming the hunted. As either would-be predator or would-not-be prey, these ancestors would have been impelled to innovate. A hunter or shaman may have experimented with mimicry—attempted to get under the skin of creatures by imitating their motions and calls (a bit like children learning to walk and talk by copying adults). Accuracy in reproducing calls would have conferred a real advantage; calls could be employed as attractants or deterrents. Mimicry may also have been conceived as connection and ingratiation with animal spirits.

I assume the nurture implicit in techno-cultural innovation of the kind would have had a physiological corollary. If so, then from this slow co-evolution, mimicry (of both sound and movement) may have come to assume more complicated forms and roles until its cosmopolitan utility and appeal entrenched it in the fabric binding those small nomadic bands. Think how observation of mimicry might impress an observer. If the mimic were an admired hunter, there could be a demonstration effect. And if, through emulation, an erstwhile observer achieved greater success in the hunt, they and any they provisioned would have stood a better chance of surviving to pass on their genes. Offspring privy to the secret of their skills and stratagems would have passed them on through the generations. Initially, transmission may have been inadvertent, a result of casual copying. Later, it may have been formalised. A place of respect would have been consolidated for any physiological predisposition facilitative of mimicry.

Utility aside, the obvious enjoyment by mimics of their activity might have tempted others to develop their own prowess. Enjoyment may have been purely physical; use of the vocal apparatus and body, in imitating calls and copying posture and movement, would have exercised an extensive array of muscles, and movement per se can invoke hormonal responses that are experienced as pleasurable. However, it probably also had an emotional component: I understand that motor neuron impulses from the muscles reach the conscious part of the brain (the neo-cortex) via 'the seat of our emotions' (the limbic system). And it could have had an intellectual aspect.

Paul Bloom is a psychologist who studies the nature of pleasure. He frames the practical implication of his work this way:

> “if you want to enhance the pleasures of your everyday life, one way to do so is through knowledge. If you want to enjoy wine more, the trick is to learn more about wine. If you want to enjoy art more, the trick is to learn about art. The more understanding you get, the richer your experiences will be.”[16]

This pleasure-learning principle hints at a virtuous spiral forming for our hominid predecessors: satisfaction derived from meeting the challenge of learning new skills sparking further practice, resulting in greater attainment, etc.—mutual reinforcement of utility, enjoyment and imitative behaviour. Thus, from beginnings in spontaneous vocalisation and repetitive movement provoked by a heightened emotional state, the art of mimicry would have blossomed.

Within a band there would have been some who chose not to join in: for women, as gatherers, (rather than hunters) mimicry may have been less useful. Still, few people are unmoved by music and odds are non-mimics too would have taken pleasure in the activity going on before them as their eyes and ears took in its rhythmic, repetitive stimuli and their bodies kept time. Observing this, our ancestors may have instinctively apprehended that, in particular, this archaic ‘music’ could be practised to fortify bonds—moderate events and circumstances which might otherwise have redounded to the disadvantage of the entire community.

For those tightly-knit groups, every individual counted and anything which disrupted relationships would have been momentous: births, deaths and marriages as much as war, pestilence and famine could have upset communal balance or stability. Dysfunction due to lingering sadness and dejection after the death of a tribal elder would have been unaffordable, and the aim would have been for everyone to mourn, restructure and move on. But joyous events would, no less, have called for a degree of management. If a death meant closing a gap in hearts and minds, birth was about opening up space in them and marriage about accommodation of a new entity where once there had been two.

At such junctures, rapid attunement to the desired emotional outcome—swift, harmonious adjustment to structural change—would have been of the essence. In theorising that our remote ascendants invoked the power of music to facilitate that realignment, Benzon posits a simple mechanism: a harmonising effect of music rooted in concordance of key brain functions among people concurrently entranced by the same piece. Melody and rhythm, he tells us, are contagious in that all who concurrently experience the same combination of them will experience the same patterns of brain activity and, by extension, have the same experience of occasion. Qualitatively, this will be so irrespective of the nature of participation and whether the music is vocal or instrumental; quantitatively, it would differ as participation was more active (as performer) or passive (as listener). [The distinction between vocal and instrumental is, however, unlikely to have had much meaning for our earliest ancestors: the human voice was probably the first instrument consciously employed to music-making ends.[17]] That sharing—social harmony—would act as a source of comfort and support, increasing the likelihood of a common reaction and promoting acceptance of change.

[Alan Harvey also believes that “music and dance are the primary drivers of social co-operative behaviour” and “help to drive altruistic, empathic relationships between human beings”.[18] He’s at variance with Benzon, however, in that their usage to induce “cooperative, interactive behaviours” is put down to a need to balance the cognitive burden which came with evolution of a sense of individuality and the knowledge that one day we would die. He links the “cooperative synchronisation” of making music or dancing together to the brain’s emotional response and reward centres; reward-related circuits are also active when performing other mutually or socially co-operative tasks (story is instanced: teller and listener brain waves align). Co-operation, he says, seems to have been of great importance to our species—so important that nature has seen fit to ensure we engage in it by making it pleasurable.]

The image we have from Benzon is of dance and his muso-language both developing from mimicry’s sounds and actions. Subsequently, as the sophistication of tribal life grew, that vocal element of culture split into two more specialised streams which eventually became what we’d acknowledge as music and language.[19]

After some delay, these activities would have exhibited differentiation of form and function. Then music may have started to be composed with a purpose in mind: rousing pieces to raise morale in preparation for battle, or calming and cathartic airs to soothe the pain of loss. Purposive use of music, repeated recourse over time to the same musical forms, would have established an emotional and intellectual nexus between form and function.

Concurrent with this musical stream, language would also have been coming along but it may initially have done so at a slower pace. Language comes into its own when there’s heterogeneity of knowledge, experience and attitudes (specialisation and individuality). Life dominated by the challenge of surviving nature’s whims may not have left the time and energy to specialise and individualise. If that wasn’t a limiting factor, it’s conceivable individualism was discouraged as unconducive to peaceful coexistence, while distinction through knowledge or skill would have been virtually precluded; most knowhow would have been collective.[20] With nearly total uniformity of local- and world-views at the scale of interaction most people would have experienced, conceptualisation would have evolved at a glacial pace. In these conditions, the push may have been more towards capacity for integration than discrimination. [Bear in mind though that, since a co-evolutionary stance on music and language presupposes shared sound production and auditory processing systems, there’s bound to have been a sizeable overlap between the sounds comprising pseudo-language and music anyway.]

Against that, the new environment would have presented other challenges that mimicry, muso-language and music couldn’t meet. For example, important as they’d have been to forest browsers, co-operative action and communication—transmission of abstract cognitive content, at close quarters and over distance—may have taken on a critical dimension for hunters on the open plains anxious to transmit information unmistakeably yet without disturbing prey or attracting predators.

While efforts to improve communication would have expanded sign vocabulary our ancestors would also have plied the sound repertoire and vocal capacity acquired through mimicry, turned them from copying to making meaning explicit. When language proper arrived on the scene (language recognisable to us as such) it would have been a game changer. Prior to its arrival (and that of its affiliate, reason), a traveller could have journeyed far in time or space before undergoing culture shock. Language changed everything—radically altered the relative contributions of nature and nurture to 'evolution' (as transformation in the structure and functioning of life).

The sequence I've outlined—side-by-side evolution of music and language—is consistent with one borrowing neural circuits, vocal apparatus and so forth from the other before either was identifiable as a separate skill, the two then progressing in tandem until a developmental spurt in the musical stream brought about a parting of the ways. Benzon himself was more of a mind that music came first. At the end of the day, it's immaterial to me which preceded which—or whether either was initially adaptive. [That didn't stop me speculating whether our emotional receptivity to music and trouble finding words to describe emotions aren't best explained by music pre-dating language.] What does matter is that music could have survival value now, so that's where we'll go next.

2.3 Music, language and future decision making

I take Benzon to be saying that cultural capital was made from the visible symptoms of invisible, unsuspected, cognitive processes. Provided music and language came to coexist early in the evolution of our species, they'd have been formative for body and brain; set nature-nurture feedback loops in motion, jointly determining brain structure and function. Concerted exercise would extend their relation from coexistence to coevolution, and we have abundant evidence from diverse cultures that humans have been working concurrently with music and language for a very long time.

[Many an oral tradition of information transmission has musical accompaniment. Australia's aboriginal people are an example. Traditionally, they've held to an oral story-telling culture. Stories are the foundation of 'songlines' that criss-cross a land sung into being; if the stories die, so too does culture and, with it, country. Story and land, culture and country, nurture and nature are one. In their use of melody and rhythm to facilitate information retention and transmission the songlines constitute a living reminder of past, highly effective information storage and communication systems.[21] A realisation of the same synergy—that the presence of music aids retention of linguistically-transmitted information—is embedded in much Western music. Many Western song forms have their genesis in the ancient Greek practice of accompanying performances of narrative poetry with the music of the lyre.[22] The bard's music, in these performances, was, however, subsidiary to their words; in that time and place it was considered uncultured to play music other than as an accompaniment to poetry.]

If our incipient aptitudes for music and language (sign and verbal) fostered incremental, definitional growth of allied body parts and mental processing systems, they'd have been primal forces in the interaction between socio-cultural change and the physiological 'blueprint' which saw us evolve a neo-cortex. And this has a bearing on the place of music and language in present-day human societies.[23]

The neo-cortex could be termed our locus of perception: via language, it converts sub-conscious sensations, feelings and emotions into constructs amenable to coherent, logical thought processes. However, the neo-cortex also acts as a gatekeeper, filtering and restraining impulses emanating from the older reptilian and limbic brain layers.[24] Necessary to insulate against sensory overload, gatekeeping activity also controls awareness of sensory stimuli. It's the frontal part of the brain—where higher cognitive functions are located—that has 'filtering' authority.[25] It lets in only information appertaining to what we're attending to at present or aren't in the habit of shutting out, and inhibits information that we now, or habitually, choose to ignore—whether factual or emotional.

That is, if our patterns of attention or representations of past experience have tagged a stimulus as low priority or negative, it's liable to be denied passage. That being said, the neo-cortex has greater control over some stimulus categories than others—auditory than olfactory, for example. By the time odour signals make it to the neo-cortex, they've been fully processed: sub-conscious perception and certain physiological reactions have occurred. There's nothing the neo-cortex can do to thwart that; all it can do is permit or deny consciousness of the odours and reactions. Hearing isn't achieved until stimuli have been processed in the neo-cortex; if signals are jammed there, perception won't occur.

If neo-cortical access control depends on the sense stimulus received, the likelihood it will be filtered out would also depend whether we were processing it linearly or not. To begin with, both the concrete and the abstract would have been expressed through proto forms of language, music and dance—highly emotive sound and motion. Then language emerged as storekeeper, manipulator and communicator of information. How did this come about? Well, one hypothesis is that motion, like most concrete processes, is linear (in time and space) and the step-up in linear cognitive processes resultant on a life of movement made possible both rational thought and its expressive medium, language. In turn, language linearised mental processing of the concrete and reduced the need for motion to impart related information.[26] With the passage of time, this bi-directional relation would have made it easier to work with reason than the emotions, and the more so when working collectively.

Contrariwise, abstract situations (those involving conceptual or experiential knowledge rather than material/physical forms or states) remained relatively uncoupled from linear processing. They continued to be lived, and dealt with, through motion and emotion, hence the older form of processing with its greater recourse to (what I've referred to as) 'pattern' processing. With language having taken on the lion's share of responsibility for representational communication, music, left with abstraction, became specialised to entertainment as well as communing of a spiritual/religious kind.

Several consequences of note flow from the foregoing. Music and language would use the same peripheral auditory receptors but slightly different central brain mechanisms to draw meaning from acoustic stimuli. Perception of feelings would proceed via a route more closely aligned with that which music follows. In so remaining un-linearised, the intelligence of the emotions would have been less readily verbalised, therefore less amenable to reason, which is perhaps why it has become suspect in language-based decision making. The same fate didn't befall emotion in music; freed from the encumbrance of representational precision, its effectiveness in carrying out its residual tasks would have become even more tightly tied to its ability to convey the inexpressible. Filtering of emotional input by the neo-cortex may, then, have tightened for language but relaxed for music. And the possibility of rational comprehension would tend to wane as a subject took on a less concrete tone, leaving us unable to manage highly abstract matters without an injection of subjective or intuitive understanding.

The pertinence of those possibilities to our decision-making problem can be restated like this. We recognise that many, pressing issues would benefit from greater diversity at decisive stages—diversity of approaches, but also (if we're to become more adept at dealing with abstractness/intangibility, hence non-linearity) of mental processing styles. However, we're hampered in our attempt to do so (to either change the priorities that would prompt filter modification or work better with the emotions) by both nature and nurture: having been taught to shun emotion in decision-making, much information wouldn't get past the gatekeeper.[27]

Then again, what the neo-cortex has taken with one hand it's restored with the other. Reason, via language, has alerted us to neo-cortical filtering and the neo-cortex, as HQ for conscious mental activity, is also where we site willpower. With awareness and volition we can manage filtering, use it selectively to redefine accumulated past experience and emend its future functionality. That is, experience determines what we perceive and how, and we, through the exercise of willpower can reshape experience, thence our priorities and the chances of specific stimuli registering. To the extent that this ability (a composite of cognisance and self-command) is reliant on language, nature-nurture circuits are again revealed—iterative firming of nascent brain and language propensities. [The reciprocal relation between brain structure and function—the fact we can coax the gatekeeper into approving a new set of rules—represents the paradox of mind.]

The more relaxed filtering of music also intimates there's one context in which we can be reasonably assured entry to consciousness will be granted to the products of both intellect and emotion: engagement with song. When we sing, we've access to both the concrete/rational information of language (as lyrics) and the abstract/emotional messages of the music with which it's bound. That's the nub of the idea that song might be our saviour. Might. For a song-tool to succeed, that access would need to be simultaneous and there'd have to be a carry-over effect: singing would need to integrate IQ and EQ, and a tendency to integrated processing would have to endure when the singing was done.

With that realisation, the contours of my research agenda began to be discernible. I hadn't the vaguest idea what I might discover when I began to fish for scientific corroboration of simultaneity but that didn't faze me. Our brains are parallel processors—and I already had a pointer to permanence and portability in Benzon's discussion of cantometric investigation by Alan Lomax.[28]

'Cantometrics' is the statistical analysis of singing styles correlated with anthropological data.[29] Reading Benzon's Lomax reference, I'd been intrigued to learn that societies which require people to work closely together (such as those based on gardening and horticulture) favour a style of music involving a close blending of voices and rhythmic movement, while those whose economic basis calls for a greater degree of autonomous action (as, for instance, in hunting) exhibit less cohesion in song. Although Benzon reminds us that correlation isn't causation and downplays the degree of fit Lomax found (describing it as reflecting a rather coarse-grained view of both music and culture), he agrees with the broad thrust of the latter's results. For him, the “consistent correlations” Lomax found between culture and social structure suggest the music of a people shapes, and is shaped by, its culture.

Music patterns the brain and the same brain pattern governs the life of the individual in all its variety, including its music-making. That interpretation is consistent with more varied social structures and musical styles in the diversified West. But on re-reading Benzon I saw he’d gone further than I’d recollected: it’s his impression that, in the absence of a cultural imperative to musical harmony or any harmonising commonality in musical style, brain-patterning would predispose to an individualistic approach to power and authority. In this way, he says, brain patterning determines what we’re prepared to accept or reject in terms of approaches to authority.

My immediate reaction was to think ‘And what we demonstrate when in a position to exercise power.’ Many of us are politically passive, content for our lives to be directed by those to whom we’ve handed leadership power. But their power patterns their brains differently to ours and, quite possibly, more individualistically, particularly in highly diversified societies which may lack the cohesion of common rituals. Logically, however, if cultural diversity regulates musical diversity and vice-versa, there’s scope to apply music to decision making—to ritualise music with the aim of inciting a sea change in decisional practices.

That is, a connection between the music an individual is accustomed to, some aspect of their brain-patterning and their comportment in society should mean that music could be used to change how we exercise personal power and authority during decision making—thence that, by employing co-operative Song forms, we might encourage growth of a co-operative and cognitively inclusive approach to decision making. Such an approach would reward ‘leaders’ able to weave, maintain and deploy the web of connections on which sustainability depends. No soloist can achieve the impact of a choir exhibiting good sonority and no individual acting in isolation can hope to achieve the wisdom of diverse individuals acting co-operatively.

Nothing is ever likely to displace language in information transmission and communication. However, our forefathers, in communicating through language’s said antecedent, mimicry, would have leaned as much on their skill in what would one day become music as language, and both continue to evolve. If we believe music has something to offer humanity that we’ve overlooked, why wouldn’t we make the effort to see how we might reintroduce it to now-language-dominated decision making?!

In sum, *Beethoven’s Anvil*, alerted me to music’s long history of service in mundane areas of life far removed from The Arts and provided an explication of music’s harmonising effect. Re-visiting it set my feet firmly on the path to exploration of a modern decision-making application for music. More recent writings (which we’ll return to in a subsequent chapter) seem to confirm Benzon’s insight into the co-ordination of different mental functions that underlies the role of music, in our lives, further buttressing the rational foundation of my song-as-tool proposition.

Figure 3 depicts the partnership behind that concept. It’s intended to convey the essential complementarity of music and language in song: evenly matched as almost universally accessible forms of nurture, each is unrivalled in its ability to work with one of the brainpowers we’re looking to integrate—music with the emotions and language with reason. That's what augur's so well for song as a harbinger of peaceful coexistence between the two during decision making.

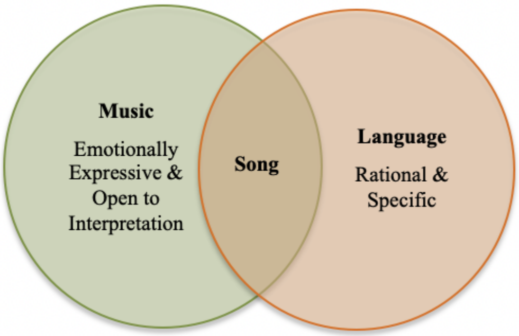

Figure 3—The Music-Language Partnership of Song

When I say that music works with the emotions, I intend that music's importance to us arises largely out of its ability to arouse in us an emotional response (on display at births, deaths, marriages, flag-raising ceremonies, religious and sporting events, etc.). We may actively seek to interpret the emotions a piece of music causes us to experience (in a story-telling manner), or passively go along for the ride. Either way, the more we relax and allow ourselves to experience the emotional power of music, the more we engage with it and derive from it. I'm assuming we can extrapolate from that to say regular engagement with Song could intensify emotional awareness—and in so doing perhaps develop EQ qualities such as empathy.

IQ, on the other hand, gives us our linguistic capacity to name and categorise. Those abilities facilitate description and comparison—hence memory and discrimination—but since we aren't good at applying them to emotional sensations we may be leaving untapped much of our potential to discriminate between feelings we and others might be experiencing.[30] If language names what music arouses (sometimes nameless emotions), then song, by habituating us to the unemotional verbalisation of feelings, would make them more accessible to process of reasoning. And if that enabled us to more easily isolate emotions (separate cause from effect), we'd be in a better position to manage our own and handle those of others (feel less subject to them).[31] Master that and we'd be on the road to overcoming the current decision-making bias towards IQ.

If we could vanquish that bias—abandon our perception of the emotions as irrational and so see them as equally creditable advisers—perhaps we'd be prepared to invest words such as sustainability with a positive emotional valence (that of empathy, for example). Then we might feel more deeply what unsustainability implies and elevate sustainable living from idea bandied around to priority goal.

There you have it, how I came to the idea of song-as-solution—of using the relation between music and empathy to counterbalance regrettable side effects of that which exists between language and reason. Empathy being interpersonal, a Group Song form should prove most efficacious; explaining why, amongst Group Song forms, I singled out Choral Harmony compels me to now detour into the personal.

2.4 Choral Harmony—my experience

My sole, adult experience of singing outside the shower has come through participation in ‘Community Choirs’. What I most enjoy about that is the rich tonal qualities and ‘surround sound’ which emerge when a group manages to sing ‘as one’. In those moments, I’m so completely identified with the activity that nothing else can perturb my conscious mind.

In two of the three groups I’ve joined, we sang A Cappella Choral Harmony (ACCH). Literally, ‘A Cappella’ translates (from the Italian *alla cappella*) as ‘in the manner of the chapel’, reflecting the embryonic Christian church tradition (instantiated by Gregorian chant) of song unaccompanied by musical instruments.[32] ‘Choral Harmony’ lets us know that consonant notes are sung, simultaneously but as autonomous vocal lines, by singers with complementary vocal ranges. There’d usually be four such vocal-range sub-groups, or ‘parts’ in these choirs—Soprano, Alto, Tenor and Bass (SATB); larger and/or more formal choirs may regularly sub-divide into six or more. The performance of ACCH choirs is reliant on a blending of voices within parts, and balanced merger between them, as well as attention to the Choir Director—on active, responsive, *co-operative,* engagement.

You could say that choirs epitomise co-operative action to a group end, and it seemed to me that repeated sharing in such acts of collaboration might, by increasing regard for the merits of close co-operation, train for it. However, I had a lot to learn. A Workshop (for participants from multiple choirs) targeting active harmonisation—the practice of blending one’s voice and assisting blending by others—provided a particularly salutary lesson. If the main exercise (entered into by small, temporary groupings) was elementary, it’s results were remarkable. When, on its conclusion, singing recommenced, individuals had put aside preoccupation with getting it personally ‘right’ (or sounding good); the effect was a noticeable reduction in intra- and inter-part timing, emphasis and volume differentials.

For all that many from my choir were present that day, the impact of the exercise was transitory; one by one we abandoned our timid efforts at post-event praxis. Of the sundry things happening (or not happening) which might account for discontinuation, one stands out in memory—a musical version of the economist’s ‘free rider’ problem: effortless prominence for the singer who breaks ranks. Why a chorister would comport themselves like that, I’m not sure. A desire for attention can cause a singer to conserve, or invent, a distinctive sound. If confident of their voice, they might even feel they were acting in the choir’s best interests—that it was fitting they should show vocal ‘leadership’. To be sure, they’d have to brush off the inconvenient fact that harmony is more about congruence than leading and following, but it may suit a competitive personality (or a person driven by low self-esteem in other respects) to do so. Whatever the reason for such behaviour by individuals, you’d have to assume these ‘Prima Donnas’ are as blind to the harm done group morale and functioning as to the (image) disservice they do themselves.

Thus, the lesson from that Workshop and its aftermath was this: vocal harmony is as conditional on will as ability—willingness to suppress any competitive tendency or disinclination to adjust so as to blend. There can be no true harmony unless each and every singer actively pursues it. It’s worth noting two more insights of relevance gleaned from participation in Community Choirs. The ego abandonment and concentration of a sincere bid to harmonise doesn't leave a lot of room for negative sentiments (anger, irritation, animosity and suchlike), or downheartedness. And when singers are in harmony, directorial leadership can be more relaxed—veer towards flexible guidance; this 'power sharing' enfranchises a choir, freeing it to find the best within itself, its own voice.

2.5 Why choral harmony

Having narrowed the field of vision from a broad Song perspective—that opened up by Benzon—to Group Song and then Choral Harmony, it's time to see whether the latter can pass muster when checked against my efficiency and effectiveness criteria: balanced recourse to EQ and IQ; incorporation of language; and accessibility. Choral Harmony, in giving its participants unmediated knowledge of what co-operative effort can accomplish, potentiates contributory voices. Moreover, it's no small thing that willed harmony should distinguish the form when the aim is to make constructive use of music's inbuilt capacity to bring hearts and minds into consonance. Finally, its layered complexity adds to the pattern processing call made by Group Song in general, without adding to the difficulty of execution for singers. Altogether, I feel I can tick off my first criterion. Choral Harmony also amply meets the second. As for the third, Group Song is eminently accessible: a component of many cultures since time immemorial, it's a type of activity anyone can enter into, anywhere and at any time, and Choral Harmony is no exception.

Part One concluded that we should, in the interests of wiser global outcomes, learn to integrate reason and the emotions—IQ and EQ. In beginning Part Two, this chapter has recounted how Benzon and community choirs got me to thinking song might manage that. While elucidating those influences, I noted my inclination towards the view that its partners, music and language, co-evolved. It's a necessary condition of a co-evolutionary stance that change affecting one of the partners could provoke a change in both, and in the brains that enabled them. I'm proposing we apply that knowledge—trial song as a tool of integrated decision making.

To do so is to bank on Group Song's language-music concurrency and other integrative properties: its combination of listening and collaboration along with its accessibility, but also its wide appeal. Given the latter, does it really make sense to come down in favour of a sub-form—A Cappella Choral Harmony—that's more West-centred than cross-cultural and whose enthusiasts, even in the West, aren't exactly legion? That's a matter I'll take up in a later chapter; here, I'd say this. My primary concern is the West's answerability for planetary afflictions, so although I firmly believe Choral Harmony can play the role I've allocated it on a world stage I'd be recommending a local première. With improvement obvious in *our* decision making we'd have far less cause to fear accusations of cultural imperialism should we presume to ask others to also sing this form of (perfect!) harmony. From a fairly EQ approach, we'll now come at my Song-as-tool proposition from more of an IQ direction.

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[1] More usually, the call I heard is described as a deep, guttural rumbling.

[2] Drake N, *Stealth percussionists of the animal world*, Guest Blog, Scientific American, 22 March 2011.

[3] National Geographic News, 26 March 2011 (online).

[4] TV and some other electronic communications do make use of both audition and vision (in fact, they may be made excellent use of by video-conferencing services such as Tele-Health). And at least one comment I've come across leads me to think Virtual Reality could serve to increase empathy by producing the feeling of being a part of what's happening—of (literally) being in the other's shoes. Nevertheless, some of our most ubiquitous forms of electronic communication—notably, text messages and email—involve neither.

[5] Benzon WL, *Beethoven's Anvil; Music in Mind and Culture*, Oxford University Press, 2001.

[6] This is another jotting I've made without noting the ABC Radio National programme details.

[7] It seems (from an ABC Radio National programme I caught part of) that the actors chosen for the 2018 premiere of a new play based on WWI history were a very diverse bunch of ordinary people, most of whom had little prior feeling for the events they portrayed. When questioned afterwards, they reportedly said that engaging with history in this way had brought it to life. I took that to mean they'd experienced a sense of empathy for people who wouldn't otherwise have elicited it from them.

[8] Pinker famously opined that music conferred no survival advantage, it was: "auditory cheesecake, an exquisite confection crafted to tickle the sensitive spots of" a number of mental faculties that did have such an advantage. Pinker, op. cit.

[9] Patel AD, *Music, biological evolution, and the brain.* In: Levander C and Henry C. (Eds.), Emerging Disciplines, Rice University Press, March 26, 2010.

[10] Levitin DJ, *This Is Your Brain On Music; The Science of a Human Obsession*, New York, Dutton, Penguin Group (USA) Inc, 2006.

[11] Patel, op. cit.

[12] Levitin, op cit. Theories of the sort are attributed to: Trehub SE; and to Cosmides L and Tooby J.

[13] Patel, op. cit.

[14] The 'group cohesion' theory of music 'concerns possible benefits of music to group cohesion'. Patel, op. cit.

[15] Sources: Gordon M. Shepherd, op. cit.; Mahmood F Bhutta, *Sex and the nose: human pheromonal responses*, J R Soc. Med. Jun 2007, 100(6): 268–274; and Wiki, Color Vision.

[16] Paul Bloom (as interviewed by Ben Lillie), *Why Pleasure is Important*, TED Ideas, 6 October 2015.

[17] Birds, whales and many other creatures 'sing' but it's not (as far as we know) their intention to make music. Harvey notes that, while there are doubts as to whether the oft-referenced Slovenian, holed Cave-bear femur is in fact a flute, a number of bone or ivory artefacts which indisputably are may date back 35-43,000 years (that is, almost as far). Harvey A, *Music, Evolution and the Harmony of Souls*, Oxford University Press, 2017. The refinement so

evidenced would suggest a stage of human evolution not inconsistent with Song in some form had been reached by that period.

[18] Dr Alan Harvey, interviewed by Robyn Williams, *Music in human evolution and modern-day society*, The Science Show, ABC Radio National, 15 July 2017.

[19] The ‘yoiking’ of the Sámi people (who are from the northern areas of Norway, Sweden, Finland and Russia and, traditionally, have been reindeer herders or arctic farmers) is a musical form that provides one of the clearest links between music, language and mimicry. Interpretation of nature is at the core of yoiking, but it’s said to be much more “broad-band” than story-telling and a form of communication in which there’s no distinction between subject and object (singer and song). *Yoiking with Ánde Somby*, interviewed by Andrew Ford, The Music Show, ABC Radio National, 21 January 2018.

[20] There’s an alternative view of early group life for, at least, Aboriginal Australians, is that, far from constantly struggling, people’s needs could be met so readily that they had more time for social and cultural (that is leisure) activities than many of us do today.

[21] Interestingly, it seems there’s strong neuroscientific evidence to the effect that two things are stored deep in the hippocampus: links to place and to music.

[22] From this comes ‘lyrics’ as words set to music, the words of a song.

[23] By ‘blueprint modification’ I mean physical alterations, to our bodies and brains, in clearly defined and genetically encoded ways. ABC Radio National, *The making of a magnificent memory*, All in The Mind with Sana Qadar, 2 January 2022.

[24] That control seems, however, to be less in the sleeping than waking state. These three—neo-cortical, reptilian and limbic—are the eponymous layers of Dr Paul MacLean’s ‘Triune Brain’ theory. The theory has its limitations but the distinction made serves my purpose here.

[25] Mehdi Ordikhani-Seyedlar, *What happens in your brain when you pay attention?*, TED2017, April 2017.

[26] Unfortunately, I can’t attribute that hypothesis; I’ve been unable to relocate its source.

[27] Logic is a system of verbal reasoning, so wordless ‘Sign’ and ‘mental cinematography’ (used by, respectively, hearing-impaired and many people with autism) may be less prone to such loss and, for that, a richer thought mode.

[28] Benzon is referring to: Lomax A, *Folk Song Style and Culture,* New Brunswick, Transaction, 1968.

[29] Britannica.com.

[30] That thought occurred after reading an article by Gordon M. Shepherd on the contribution made by Language to olfactory perception, his thesis being that, although humans possess relatively few functional olfactory receptor genes, they ‘smell with bigger and better brains’! Gordon M. Shepherd, *The Human Sense of Smell: Are We Better Than We Think?* PLoS (Public Library of Science) Biology 2(5): 0572-5, May 2004.

[31] Emotional maturity of the sort is a precondition for constructive, non-judgemental comportment in the emotionally-charged situations associated with empathy distress or burnout and, equally, where there’s a risk of empathy avoidance (for fear of being stirred by it to make an ‘unreasonable’ decision).

[32] In the West, today, the adjective may be descriptive of either group or solo unaccompanied singing and covers genres as unalike as Gregorian Chant and the rapper’s beat-boxing.

3

Introducing CP and IP

As we interface with others and the environment we're constantly processing signals received. How we process them—how we become cognisant of the information they convey—colours the meaning we draw and meaning shapes our decisions. If decisions are to be wiser, we'll have to develop our ability to simultaneously process both rationally and emotionally-sourced information. The argument for song as 'enabler' has two pillars. There's it's concurrent use of language (closely allied to reason) and music (with its appeal to our emotional nature). And there's the fact that practice does more than make perfect; it creates predilections. If both pillars stand, then song could come to alter our view of the world, lead us to see it through more empathic eyes.

Fortunately, my case can be made lucidly enough without presupposing more than a rudimentary grasp of neurobiology—of brain processing similarities and differences during the act of cognising music or language. Unfortunately, there's no single, widely-accepted set of terms to delineate human cognitive faculties or the manners in which they may join forces to give rise to perceptual mode. Because of that, while I've been able to partially meet my explanatory requisites by borrowing two existing descriptors of mental processing style, I've also had to invent a further two.

I'll begin by specifying how I wish those four processing styles to be understood then example a few mental states which might have something in common with those for which I've invented terms. That will have laid the groundwork for discussion of cognitive processing during engagement with language, music and song. [As my mission-objective is enhanced capacity to take in all shades of meaning (articulated or otherwise made to be understood), it's processing to derive meaning that will be emphasised.] The intrinsic processing complementarity of the latter will become apparent and will then be related to the claims I make for a song-tool.

3.1 Mental processing styles

The four terms I'll be using are: Linear, Pattern, Concurrent and Integrated Processing—abbreviated to LP, PP, CP and IP. [Be forewarned that in explaining the mental processing styles to which those terms attach there'll be times when I'm obliged to fall back on only partly equivalent words—intuition being one.]

The first two terms—Linear and Pattern Processing—are in general use for modes of cognition so my descriptions of LP and PP will sound familiar. LP is step-by-step thought, or sequential processing. It's most active when analytical ability is applied to differentiate within linear collections (spatially or chronologically distributed elements—physical, intellectual or emotional), during the reasoning from inference used to formulate logical propositions (establish a progression from cause to effect). Note also that LP may be consciously invoked or operate at the sub- / pre-conscious levels—occur automatically, without the need for us to pay attention / semi-automatically, when unaware that we're paying attention.

PP can be understood as the opposite of LP. That renders it roughly synonymous with 'gestalt' perception—interpreted in the English-language psychological literature as cognisance of a thing, situation or configuration as a single unit. It steps up during synthesis, to process elements simultaneously. The cognitive states in which PP may figure are as varied as for LP but they're most likely to be other than fully conscious (perhaps because there's no clear-cut, externalisable system comparable to logic for pattern recognition).

LP and PP are, if you will, the yin and yang of cognitive processing, complementary opposites. CP is their synchronous use—LP and PP operating simultaneously. It's what I'm guessing would have permitted Benzon's muso-language and continued as the norm until language and logic altered the balance. Those cultural artefacts surfaced LP, bringing it into conscious use, but CP would have remained the default for mental activity in other than a fully conscious state.

[That's not to deny the existence of unconscious processing predispositions. Denial would be refutation of difference in 'ways of knowing' (thought/feeling) and learning (audio, visual, kinaesthetic, etc.), differences which could bring about appreciable variation in the frequency and duration of CP occurrences between individuals and contexts. What it does say is that the distinctions we make when speaking about how knowledge is acquired are cultural conventions, and conscious preference is conditioned by what culture decrees to be the processing style with the greatest return to cultivation. Subtract culture and I suspect processing behaviour would make a mockery of our categories.]

Hearking back to reflections on reason's rise to prominence, I said that non-reasoned wasn't synonymous with 'illogical' or 'irrational'. Defining CP as concurrent PP and LP takes that point a step further. For those adjectives to be applicable, PP of geometric figures would have to be deemed less consistent with reason than LP of grammatical constructions. As to whether CP is 'unthinking' or 'non-thought', it depends what you take to be thought's essential quality.[1] If that's 'inner speech', then CP might be reckoned 'thoughtless' (the brain state to which we revert when self-talk is suspended). But if not thought, which of our pre-linguistic forebears' qualities led them to language? Besides, there's evidence that the pre-lingually deaf think before being introduced to language.[2] That would make CP thought's instrument; it would be consistent with thought occurring in a CP state which is interrupted when, in order to give form to a thought, we make language demands which only LP can meet. In reality, there's no consensus on how thought should be defined—no greater certainty in respect of that than other sticky questions, such as whether: language gave rise to thought; or the neo-cortex, as the substrate of language and thought is, relative to them, cause or effect. The best we can do is assume language and thought are responses to the needs of the neo-cortex and a product of its functioning.[3]]

Ultimately, however, CP isn't about concepts such as reason, thought and empathy: it's about how we process and respond to the stimuli that comprise our experience of the world. By and large, there’s a lower probability of decisions being influenced by CP today than in very early times. Habituation to language-based decision procedures has desensitised us to EQ’s messages, making us ever more reliant on IQ. The plastic brain responds by coming, across our lifetimes, to favour LP. Meanwhile, CP languishes. But if consciousness-awakening language propelled LP to dominance in decision making, specialisation consolidated its hold on our deliberations. The specialist, often obliged to focus on one role, and one aspect of a job, at a time, may be heavily LP-dependent—viz. the LP-skewed skills-profiles of STEM occupations, for example. Of course, that but points to a weakening of CP and we should, if we wished, be able to strengthen it again.

There’s good reason to believe we’ll attempt that strengthening. With acknowledgement of uncertainty has come a nascent realisation we’d do well to cultivate all processing styles. I noted earlier that our capacity to act on our world has surpassed our comprehension of the consequences of our actions; not seldom, it seems also to have outstripped our capacity to empathise with those to whose welfare our actions run counter. Empathy failure deepens social divides, increasing uncertainty. In an era of global connectivity, none can escape that verity and any step in the direction of—not just coping with, but—mobilising diversity would be to the betterment of all. [Magic happens when our brains function holistically and we work collectively.]

However, any bid to regain full and ready access to CP’s complementary aptitudes (LP and PP) will place us in this predicament: CP is elusive. Not consciously accessible, it’s an organic process that cuts in spontaneously or not at all: it can’t be willed into being. That’s why we may fall apart when, under the pressure of scrutiny, we strive to live up to expectations of our skill in some field. The attempt consists in an act of will and centring of interest which, in its exclusivity, runs counter to induction of the inclusive (CP) mind-state in which the ‘flow’ of mastery occurs. What might further cut off CP arousal is the location of ‘volitional centres’ in our dominant cerebral hemisphere. For most people, that’s the left hemisphere, which exhibits a significant degree of specialisation for language, hence for the discriminator: reason. It follows that the decision maker who relies on exercise of willpower to bring CP to bear could finish up digging themselves deeper into an LP pit.

Indeed, if CP typifies sub-conscious mental activity then the exercise of ‘won’t-power—refraining from any attempt to call it forth—should be more likely to instigate it.[4] [5] From that I assume pro-active strengthening of CP could only be achieved through indirect mechanisms. [Nevertheless, I don’t bemoan the incompatibility of CP and volitional states. If, by impeding, access to volitional centres, it led to a reduction in ‘volitional thinking’ (fewer thoughts based on ‘I want’, ‘I need’, etc. and more attention paid to the wants and needs of others) it could be beneficial.]

The requirement for an indirect mechanism is central to the potential in song: I believe we can exploit it, train our brains such that they give equal prominence to LP and PP, and make that (balanced) CP our default mental modus operandi—an enduring mark of cognitive style. To achieve that would be to have progressed to IP, the last of my four terms. IP is CP that, having been matured by activity in one field, persists, routinely revealing its presence during unrelated activities. IP is permanent and portable CP. The neutral, flexible and originative IP perspective is conducive to new ways of drawing meaning from experience. The perceptions so evolved should be better informed by emotion, better able to bring empathy to decisional procedures—without the need to programme a session of non-linear thinking techniques. An IP-society would acknowledge the value in an innate diversity of minds and establish the climate of co-operation and understanding in which inclusive, mutually productive and helpful exchange can flourish.

Those, then, are the terms I'll be relying on to set out a framework within which to talk through mental processing of language, music and song. However, as newly-minted and possibly more nebulous concepts, CP and IP may require further clarification; that's what I've tried to do in the next section, with the aid of what I take to be indirect evidence of analogous cognitive states. They're states which differ in frequency of occurrence—some are rare, others commonplace—but, in aggregate, they contributed substantially to my confidence in the CP proposition.

3.2 Analogies to CP

The source of my first CP-like phenomenon is an anecdote from *Beethoven's Anvil*.[6] Benzon advises that Leonard Bernstein sometimes identified so closely with the composer of the piece he was conducting it was as though he'd written it himself; his experience was of becoming the composer. Throughout these episodes, which may have lasted the duration of a performance, Bernstein lost all sense of himself as separate from the music: at one with it, he was its creator. His emotional state in these moments of ego-loss was that of self-transcendence.

Benzon suggests the cessation of inner speech might be a pointer to the origins of this altered state of consciousness, noting a theme amongst jazz musicians with first-hand knowledge of similar states while 'in the groove': that you have to stop thinking. Inner speech (silent use of language), he tells us, is more than thought; it's the source of our sense of identity, of ourselves as individuals. If inner speech ceases, my feeling is that mental processing would take a PP turn. That suggests self-transcendence might come from some form of wide-ranging, high-level, other-than-fully-conscious processing which I'm content to continue calling CP (or IP).

I came across 'self-transcendence' again with reference to Extra Sensory Perception (ESP). Writing on the related fields of neurophysiology and parapsychology, Koestler quotes a 1960's experimenter, the neurophysiologist Dr W. Grey Walter, who, in reporting on a series of experiments he'd conducted, wrote that "harnessed to an electric machine, by an effort of will, one can influence external events without movement or overt action through the impalpable electric surges of one's own brain".[7] This effort, Grey Walter reported, requires a "peculiar state of concentration, a paradoxical compound of detachment and excitement". Koestler himself notes that "Spontaneous paranormal experiences are always bound up with some self-transcending type of emotion".[8] Furthermore 'self-transcendence' turns up regularly in meditation copy, along with reference to psychological states marked by: shutting down the self; openness; consciousness without thought; inner listening or stillness; detachment (non-attachment to outcome); and emptying the mind (observing and acknowledging thoughts and feelings, but letting them go). It's also been used to characterise the mental state in which Einstein is reported to have said he *felt* the Theory of Relativity, long before he could prove it mathematically.[9]

MindScience; an East-West Dialogue has a worldlier example.[10] Thurman discusses nerve channel examination, a Tibetan medical diagnostic technique employing only the finger-tips.[11] He points out that its successes may be thought of as mysterious (perhaps mystical or spiritual) by fans and sceptics alike but “we can understand it simply as a kind of sophisticated bio-computer programming.” I wouldn’t gainsay Thurman, provided computing admits the concept of CP: I don’t doubt it’s the cognitive mode in which examinations are conducted. He went on to compare this ability of Tibetan doctors to the skill of a very sensitive musician!

For a downright prosaic analogy, Bateson reminds us that, across the ages, women’s work has encompassed an assortment of tasks which can be carried out when caring for children.[12] Women have had to “learn to be attentive to multiple demands, to tolerate frequent interruptions, and to think about more than one thing at a time.” Much as ‘self-transcending’ doesn’t spring readily to mind while on the topic of ‘women’s work’, I think it can be argued that the habit of ‘multiple attention’ which, for Bateson, its practices instil, stems from a similar form of processing—hence also from CP. [‘Multiple attention’ seems not unlike the psychiatrist Srini Pillay’s ‘suspended focus’, used—when speaking of ‘multitasking’ in general—to refer to a state in which attention is shifted from one thing to another but the brain has learned to hold the first thing in short-term memory for longer.[13]]

Sport offers further insights. In *Beyond Boundaries,* Miguel Nicolelis waxes lyrical when recounting an historic moment during the 1970 World Cup Final between Brazil and Italy in Mexico City.[14] As he put it, a remarkable piece of team-work by the Brazilians resulted in a deliverable (the winning goal) that “could never be predicted or planned a priori—it simply emerged out of their combined voluntary actions, in hundreds of milliseconds, before they even realised it into a conscious thought.” This “masterpiece play” illustrated “the insurmountable power unleashed by the emergent behaviour of a dynamic complex system”. That sounds very much like CP in action to me: jamming soccer players in the groove.

‘Locked-in syndrome’ is a condition in which an individual remains cognitively alert (retains their brain health) but is completely paralysed. Unable to voluntarily control their muscles, their only means of communication is through Brain Machine Interface (BMI) technology. Yet, as Dr Niels Birbaumer reports, researchers have found the overall “quality of life in the completely locked-in state is amazingly high” (“sufficient”, sometimes “very high”) and signally better than victims of this syndrome expected prior to their condition deteriorating to the point of complete paralysis.[15] As he explains the paradox, since thoughts can’t be expressed the brain quickly learns to not produce any thoughts pertaining to needs and wants. In that “more passive and sensory” state there’s intake only; nothing is willed and there can be no cause for frustration. This state, in which a huge proportion of thoughts are eliminated from the brain, is, Birbaumer asserts, one the brain “likes”, and that many meditators describe as “extremely positive and productive”. If, because of inability to communicate, thought (as inner speech) is much reduced, that would tend to imply a diminution in the call on LP. Then, unless the reduction in LP reduces mental activity in toto, PP would, presumably, increase and the locked-in state might also be described as CP/IP.

And, in a last-ditch effort to demonstrate the omnipresence of CP-like states of mind, I'll pass on Benzon's comment that even sleepwalking entails "fairly elaborate physical activities" fulfilled "without conscious awareness or subsequent recollection".[16] [There's a distinctly 'Bernsteinian' ring to that one!]

I'm sure that wouldn't be the full suite of examples which could be cited but grouped as in Figure 4 they'll hopefully bring home the abundance of circumstances in which we may find ourselves practising concurrent, high-level, LP and PP *without having willed it.*[17]

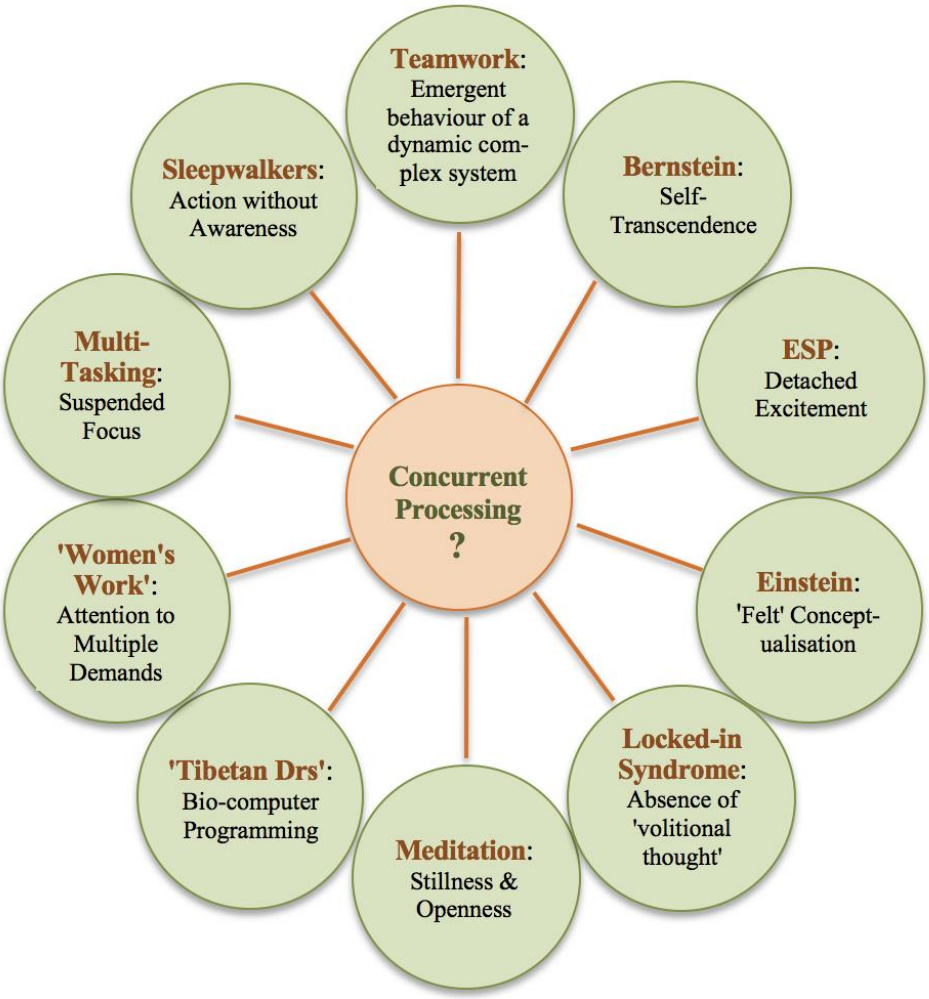

Teamwork: Emergent behaviour of a dynamic com-plex system
Sleepwalkers: Action without Awareness
Bernstein: Self-Transcendence
Multi-Tasking: Suspended Focus
ESP: Detached Excitement
Concurrent Processing ?
'Women's Work': Attention to Multiple Demands
Einstein: 'Felt' Concept-ualisation
'Tibetan Drs': Bio-computer Programming
Locked-in Syndrome: Absence of 'volitional thought'
Meditation: Stillness & Openness

Figure 4—CP and CP-Like Mental States

Since states with a resemblance to CP are unexceptional when we're operating on automatic pilot—I'd go so far as to say 'common' for activities mastered—it's reasonable to suppose our brains are fundamentally integrative; the capacity to process as did our remote ancestors has been preserved and we can return to being 'integrated processors'. As such, we'd process concurrently unless we chose to invoke LP or pursued intrinsically linear activities, and that even during conscious decision-making. LP would continue to predominate during the acquisition of, for example, numerically-based information but there'd be greater awareness of what PP could reveal. That would make it more natural to take account of the full range of available information, and do so in CP mode. Circumstances connected with the information would be experienced more directly then (less through the symbolism of words), obviating tailored, decision-specific, non-linear thinking interventions. This is the rationale behind regular participation in a CP-inducing activity.

The question remains, if CP is commonplace, why tout song? The answer is that song concurrently activates skill sets which make complementary use of LP and PP. For that, it has a better chance of routinely eliciting CP—thereby eventually precipitating IP—than any other activity I can think of, and certainly a better chance than primarily language- or music-based activities.

To substantiate that point, the next three sections have been devoted to the putative functioning of LP and PP during each of those activities—that is, language and music separately, then the two combined in song—together with the CP/IP inferences permitted by that discussion. [The implications for cerebral activation by region have, however, been held over to the next chapter. Note also that, in what follows, initial capitals for some terms—such as ‘Language’, or ‘Literal Meaning’—signifies their use within the restricted framework of models developed for those activities.]

3.3 Mental processing in Language

There are many models for the structure of language, employing a variety of terms for their main modules. The latter resume to: the sounds and written forms of words; the grammatical system that governs how elements combine to form words and words are organised in relation to each other; and the meaning of words. My choice amongst the terms I came across was dictated by what’s of interest here: mental processing of spoken language when communicating meaning.

I’ve assumed three types of meaning: ‘Literal’, ‘Metaphoric’ and ‘Intentional’. The first two are inseparable from Language’s structural elements and relate to the ‘semantics’ branch of linguistics. The third refers to the intention behind the spoken word—communicative intent imparted other than structurally—and falls under the heading of ‘pragmatics’. [‘Contextual’ is usual for meaning within pragmatics. I had two reasons for going with Intentional: semantic meaning may vary with context and I wanted to save ‘Contextual’ for meaning in Music.]

Figure 5 summarises. Together, ‘Main Components’ and ‘Meaning Types’ form the skeleton of my Language model; once I’ve put some meat on those bones we’ll be ready to address mental processing in relation to meaning type.

Main Component	**Meaning Type**
Semantic: Structural Elements	Literal
	Metaphoric
Pragmatic: Non-structural Cues	Intentional

Figure 5—Language: Linguistic Elements and Meaning

I'll lead off with Pragmatics and Intentional Meaning. Language is, arguably, the most objective mode of human communication. However, none can ever be entirely free of subjectivity (as all sense perception is physiological, those pesky return loops between nature and nurture see to that) and non-verbal transmission of information is laden with it. [That this subjective element causes Intentional Meaning to be majorly reliant on EQ doesn't make 'Emotional Meaning' an appropriate substitute and the term has been reserved for the sentiment-derived meaning we may respond to in Music.]

Intentional Meaning is mostly derived from body-language, prosody, and vocal sounds or exclamations (plus our remembered experiences of similar situations). Such non-verbal communications are more often than not spontaneous effusions of underlying emotional state, and interpretation is as much about the 'how' as the 'what' of speech. In a live dialogue, we'd often be hard-put to say why we'd concluded precisely what we did. Was it choice of words, tone of voice, a facial or other gesture? Most likely, it was 'all of the above'. However, because we're heading towards comparisons with Music and Song, I've kept my treatment of meaning to circumstances permitting only of auditorily-based communication (providing no visual clues). In such exchanges, prosody carries the burden of communicating Intentional Meaning. That is, for the remainder of this chapter, if in doubt, take 'Language' to be speech as processed by an 'average' speaker or listener and prosody to be the source of Intentional Meaning

Prosody is the aspect of speech which may endow it with a 'musical' quality, a rhythm and flow (at a pinch, melody). It comprises the non-structural cues which give speech what we may think of as 'expressiveness': intonation (monotone, sing-song, etc.), speed of delivery and vocal inflection (voice modulation—for example, speaking gently or in a more authoritative manner). Although perhaps most frequently a reflection of the speaker's emotional state, prosody may also be generated to studied effect (as through a purposely curt, gentle or distant tone of voice). At any rate, it's a font of insight not obtainable from the structural elements of language. Such is its importance to accurate interpretation of spoken language that deviations from familiar prosody can be baffling (even when, as can be rightly said of the dialects known as 'Southern black American' and 'Indian English', word usage doesn't stray far from 'BBC English'). It's because Intentional Meaning is neither fixed nor explicit that I style Intentional Meaning 'EQ-dependent'.

Turning to semantics, the structural elements to which that term refers give language its ability to make meaning explicit. Chief amongst them are words and the grammar which serves to relate words. Simplification in this part of the model will take the form of saying that both Literal and Metaphoric Meaning are co-determined by words and grammar.

Words have defined meanings. That gives language a measure of specificity but defined meaning may vary with setting ('bark' may call to mind a dog, a tree or both; 'nails' a hand, hammer or both). Nor are languages static. As cultures evolve and disciplines come into existence, new words are added to vocabularies and old ones change or expand their literal meaning. [Beginning in about the 14th century, 'thou', 'thee' and 'ye' were gradually replaced by 'you'. For a more recent example, think 'nice'. Having carried a multiplicity of meanings over the years, from 'foolish' or 'stupid' to 'strange', 'wanton', 'coy', 'finely discriminative', 'trivial' and 'doubtful', it's now most frequently heard in the 'Kath and Kim' sense of something liked. Interestingly, 'silly', which nowadays is quasi-synonymous with 'foolish' or 'stupid', once referred to things 'worthy' or 'blessed'.[18] Then we have the self-identifying singular 'they' preferred by some transgender individuals, and the countless words spawned by information and communications technologies.] And Literal Meaning can be a pitfall during cross-cultural communication in that similar sounding words can have quite different meanings in different languages.[19] [As to whether globalisation and computerised translation increase or decrease the chances of misunderstandings arising, the jury is out.]

Moreover, much of the particularity in language is underutilised. An English dictionary may contain entries for not much short of a quarter of a million words. That's a fraction of the probable total count yet it dwarfs the number in common usance.[20] It's estimated the average native English speaker has a passive vocabulary of 20-35,000 words (about 14% of that quarter-million). Specifying active command reduces that number by a third (14% reduces to a little over 9%), while 95% of garden-variety texts get by with as few as 3,000 (not much more than 1%).[21]

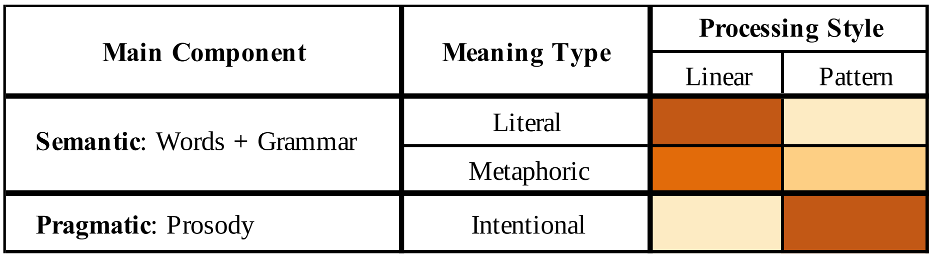
In short, vocabularies now rarely completely overlap. It remains that, being definitionally invariant within a setting, Literal Meaning would be largely IQ-dependent. That as against Metaphoric Meaning, for which significantly greater resort to EQ could be expected.

Metaphoric Meaning is meaning by suggestion, words plied nonliterally, perhaps to convey the inexpressible ('Music, sweet music'), and cannot fail, therefore, to be semi-variable.[22] Within cultures, the central idea of a metaphor might be shared but not affective reactions; they could vary considerably between individuals and occasions, depending on lived experience, previously-formed word associations, and contemporary beliefs and customs. [For a 21st century Australian, 'a silken youth' is unlikely to conjure up the 'ideal son-in-law' image it described in early 20th century East European ghettos.] Still, Literal and Metaphoric Meaning can never be totally dissociated; comprehension proceeds from the former to the latter. Responsibility would therefore be divided: IQ for explicit, EQ for figurative meaning.

Grammar is secondary to words in that it has no semantic content independent of them, serving to clarify and extend Literal and Metaphoric Meaning. It's reducible to rules governing inflection and syntax. [Inflection is used with nouns to show number (emu + s => emus), with verbs to give tense (speak => spoke) and with adjectives to form comparatives and superlatives (loud => louder). Syntax governs construction of full sentences, prescribing how subject and object, nouns, verbs, adjectives etc. should be sequenced for the meaning a sentence is intended to carry. [See how word order changes meaning in these sentences: How intelligent are you? How are you intelligent? and How intelligent you are!][23] Regardless of this prescriptiveness, syntax, and to a lesser extent inflection, are flexible enough to brook distinct literary styles, the rule-bending of colloquial speech and poetic licence. Formal or informal, the rules of grammar must be learned if word meaning is to be accurately gauged, and that makes grammar an IQ responsibility.

With that preparation behind us, I can start to talk about brain activity when we tap Language for meaning—the calls that might make on LP and PP. [A reminder: 'Language' is speech as processed when an 'average' person talks or listens.] Figure

6 gathers together the points I'll be making (it's colour gradations are an indication of the extent of dependence assumed).



Main Component	Meaning Type	Processing Style	
		Linear	Pattern
Semantic: Words + Grammar	Literal	🟫	⬜
	Metaphoric	🟧	🟨
Pragmatic: Prosody	Intentional	⬜	🟫

Figure 6—Language: Meaning and Processing

You'll recall that LP is defined as step-by-step-, and PP as pattern-processing. Since speech is delivered word by word in accordance with the (linear) patterns of syntax, both LP and PP must be operative when we take in the Semantic Meaning Types, Literal and Metaphoric, only the load isn't identically spread for them. Literal Meaning is all about words and grammar, so almost solely contingent on LP; in deriving Metaphoric Meaning, a little more responsibility passes to PP. When we come to Intentional Meaning, PP is to it what LP is to Literal Meaning: LP could be involved in interpreting Prosody but its part would usually be minimal. If we can so colligate Meaning Type and Processing Style, CP could be active during any Language-based event consisting in—as most do—a shifting merger of Literal, Metaphoric and Intentional Meaning. However, the composition of CP could vary substantially.

For example, we could expect that how a person was engaged—actively or passively and receptively or creatively—would have a bearing on the relative shares of LP and PP in CP. Depending where they stood in relation to those engagement and role factors, a participant's processing could also be affected by how meaning is put across by a speaker—verbally, non-verbally or both; if the latter, whether there's apparent conflict between the verbal and non-verbal messages; and, if so, how a listener attempts to resolve it. CP make-up would also be part-determined by: personal characteristics of the participant (communicatory tendencies, sensitivity to non-verbal communications, leaning towards analysis/synthesis, for instance); and language competence (acquaintance with the form of, say, English) and familiarity with the terminology of the subject matter. Cultural differences could further act upon processing: culture may have sculpted the Western brain in conformity with a CP composition in which PP is eclipsed by LP much of the time.

Although brain activity during processing of words, grammar and prosody is beyond our control, this much can be said: the more we focus on Literal Meaning, the less we exercise PP for other than linear patterns. In the extreme, PP could be so little in service, the occurrence of CP so brief and fragmentary, as to make talk of the latter pointless. Coming at those statements from another angle, if we want to increase the incidence of CP, we'll have to become more receptive to non-verbal messaging—and it may be that this is only achievable by dint of more active engagement during communication.

In an effort to get my head around the effect on mental processing of variation in engagement with, and competence in, Language, I turned to imagination, dreamed up an event that would enable me to conduct thought experiments. The device, an 'Author Talk', revolved around three protagonists: a well-known writer and two members of their audience. To the three, I ascribed varying levels of engagement and competence such as were best suited to figuring out how calls on LP and PP might differ with particular combinations of those variables, thence the composition of any CP experienced, and the gains in stimulus to formation of a CP-habit (IP) suggested. Here's the event envisaged and my speculative conclusions.

The speaker—our author—is a prodigious talent. They've written several well-received books and fronted many of these gatherings. A sensitive, market-savvy interlocutor, they're well prepared to field questions about oeuvre and understand there'll be interest in persona.

Of the two audience members in my cast, one is absentminded and has no pertinent training; the other is a writer-in-the-making and sponge-like in their eagerness to learn. I'll start with the more passive attendee, who's comfortable with a rough understanding of what the author is talking about. That would be consistent with PP and LP both just ticking over hence, for the average Westerner, a degree of skewing towards LP. They'd be in a state of low-level, lopsided CP. The would-be writer is another kettle of fish. They seem likely to swing between focus (as they 'stop' to think about the why of a statement) and uncentred awareness (as they absorb what they think the speaker actually means). I'd surmise that would exact a higher level of processing activity—whether linear, pattern or CP—but break up CP; disrupted by the effort made, CP would be the mode of cognition to which their mind returned.

For the author, their competence and presence in the moment would be such that the double act of confirming mastery through concordance of written and spoken style, and wooing the audience with their charisma, would be performed with ease. I suppose their mental state to be one of sub-conscious, diffused attentiveness in which attention to detail is consistent with appreciation of the whole. At the peak of their powers, they'd experience continuous but variably-composed CP, CP with a changing LP/PP ratio; PP occasionally dominant but LP more in evidence overall.

Although tight characterisation restricts generalisation from the example, that analysis implies unbroken CP is the more likely as engagement and competence extremes are approached. Almost continuous for the inattentive, untrained listener, sporadically interrupted for the engrossed and more literary participant, it would return to dominance, even more muscular and durable, for the no-more-immersed but consummate author. At least that's how I rationalise my gut feeling active engagement could be used to effectuate a degree of CP development.

Next: the relations hypothesised to exist between Music, meaning and cognition.

3.4 Mental processing in Music

There are two points to make up front. First, it's no more straightforward a task to pin down the elements of Music than those of Language. Pitch, timbre, melody, harmony, rhythm, tempo, texture, and dynamics are the most frequently mentioned elements but there are others and various combinations are said to be key. I was spared more than a cursory effort to sort this out by the realisation it was a non-issue; meaning in music can't be associated with its parts. Second, the parallel between this and the previous section is necessarily partial in that, while we're all linguists to a degree, few of us are musicologists.

Language processing serves a meaning purpose and is a requirement of verbal communication; we can't process to comprehend or transmit verbally without processing linguistically (consciously or sub-consciously using knowledge of the elements of language). But if 'musicological processing' is a minority experience, 'music processing' isn't. We all do that, it's just that the rest of us do it without the intellectual understanding or, on the whole, interest of the musicologist; we'd exhibit the patterns of cerebral activity that come with music enjoyed for the sake of its ambiguity and power to arouse emotions. That makes in-depth discussion of the elements of music unnecessary. In its exploration of meaning this section will, therefore, make only cursory reference to them before moving to LP and PP when musicking.[24]

On some views, music can neither possess nor impart meaning. Music does rely on syntax, through note order, but notes themselves are more morpheme than word and the validity of note relationships depends on them being pleasing to the ear rather than having any agreed intellectual significance.[25] [26] That would deny music Literal Meaning.[27] Neither, on the face of it, could music transmit Intentional Meaning. Language has prosody; music is prosody—magnified.

However, I gravitate towards Benzon's opinion that music and language are branches of a single, primeval progenitor. If that's correct, then it's counterintuitive that all meaning should have been confined to the language branch and we can validly ask whether music's excitement of the emotions might not be due to an innate tendency of our brains to interpret it as meaningful. There's also a broad approach to music theory which accepts music has power to move us deeply and believes that to be meaningful, that music has emotional meaning for us; meaning is as meaning does. Pondering how I might incorporate this into a Music model, I reasoned along these lines. The emotional arousal music may kindle in us gives it a pragmatic role; we employ it to convey, or read into it, meaning which has an EQ purpose—two, in fact.

There's one premised on continuation of the purposive use conjectured to have been made by our ancestors of music. That is, it recognises an intentionality to certain compositions. For instance, *Reveille* was originally a wake-and-rise signal for soldiers and to this day it's intended there should be an emotional response to its ceremonial sounding. But can we, from that, conclude *Reveille* has Intentional Meaning? I think not. Its meaning varies with context and there is no presumption that it can evoke a specific emotion, never mind be informative—carry meaning as does prosody in language. What's more, Intentional Meaning was presented as a way of refining interpretation and *Reveille* isn't open to interpretation, that which it represents having been established by tradition. [The same reasoning would apply to any piece of music which we, as individuals or groups, identify with a particular circumstance. *Majestic Fanfare* (in abridged form, the signature tune of Australian Broadcasting Commission news reports) or the *Marimba* ringtone (the iPhone's original default), are familiar examples.] In the end, I designated 'Contextual' whatever meaning may be borne by this category of works. Contextual Meaning is assumed to be: IQ-oriented in so far as *knowing* the link between Music and context; but reliant on EQ for *responsiveness* to it. The knowledge component would be (more or less) fixed, responsiveness, variable. In these respects, Contextual Meaning in Music isn't far removed from Metaphoric Meaning in Language.

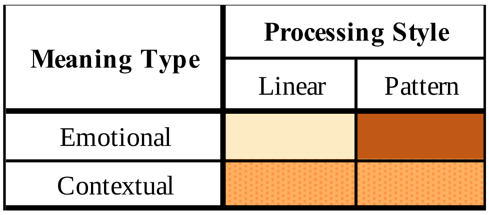
The other EQ purpose served by emotional arousal relates to the immense mass of music which is devoid of Contextual Meaning. 'Emotional' (meaning) was an obvious candidate name for that residual. However, it's application elsewhere has been criticised as encouragement to use of terms denoting characteristics (sweetness, darkness, etc.) not inherent in music and feelings (like melancholy or joy) only sentient beings can have.

Some critics accept that music can *express* such things—implicitly, metaphorically—but argue that expression isn't meaning. Others object to attributions of expressiveness being termed metaphoric. For Stephen Davies, describing music in expressive terms isn't an act of imagination or projection. Words have many meanings and such use of language, according, as it does, with the way we all experience music, would count more as literal than metaphoric description.[28] Then there are those who acknowledge the difficulty of expressing psychological and emotional meaning other than metaphorically. They get around it by distinguishing descriptive from structural metaphors, the function of the latter (in music) being to organise the composition as a body. Thus, one could listen to a piece of music *as if it were* … (a raging storm, a sobbing child). The metaphor would have both explained the musical form and revealed its expressive qualities—its spirit.[29] [30]

There's also the plain fact that, although most people accept it can't realistically be representative, we're ever ready to speak of music, even respond emotionally to it (usually in a detached state), as if it was—as if it did have meaning.

That made it a choice between 'Emotional' and 'Metaphoric'. 'Emotional' won. This form of Meaning registers more directly, calls for none of the prior intellectual understanding (of Literal Meaning) exacted by transmission of Metaphoric Meaning in Language. Conversely, music may be composed with metaphoric intent (calculated to provoke certain reactions in the listener or resonate with them in particular ways), and we may seek a message in it, but the musical experience never offers the minimal assurance of metaphor comprehension granted by Literal Meaning. It goes almost without saying that Emotional Meaning would be highly variable and EQ-dependent.

Figure 7 is the meaning-processing image of Music penned above. [NB: The figure should be thought of as referring to processing (by either a player or a listener) for *instrumental* Music.]



Meaning Type	**Processing Style**	
	Linear	Pattern
Emotional	░	█
Contextual	▨	▨

Figure 7—Music: Meaning and Processing

LP and PP are depicted as equivalent participants in the derivation of Contextual Meaning. That despite a similarity with Metaphoric Meaning in Language, and because a greater depth of feeling, hence greater reliance on PP, is plausible for the experience of Contextual Meaning. Relative to Figure 6 (Language), the processing demands of Emotional Meaning appear as identical to those posited for Intentional Meaning (with its source in prosody, the music of speech) and the converse of those shown for Literal Meaning. Processing for Emotional Meaning becomes the average person's (the non-musicologist's) processing of context-less Music.

Now to what could be taking place that our processing of music should be as designated. Music, more flexible than language (less constrained by syntax) and more open to interpretation, nevertheless has a temporality. Compositions unfold in time and that tells us LP must be active if we're to comprehend their structures and pathways. Apropos of melody, LP would be invoked to analyse the relation between notes or anticipate their progression in a known piece, whether the act of comprehension was conscious or sub-conscious. LP would also be the agent of any search for meaning or quest to name emotions aroused. PP would be the lead actor when it came to perception of the shapes within a composition—the patterns (linear or other) in melody and rhythm—and of the piece as a whole, from beginning to end or relative to the event setting. Either or both of LP and PP could be effecting the assimilation of texture, rhythm and dynamics, even timbre and harmony.

The presumption is that, as for Language, CP could be a feature of all involvement with Music; within it, factors closely paralleling those most relevant to real-life processing of Language would determine which of LP or PP was most active. They'd include analytical or synthetical proclivity, familiarity with music theory and exposure to the genre or piece, along with the engagement- and competence-related variables whose impact was brought out for Language.

From another standpoint, it's not hard to see how the disparity noted between musicological and linguistical training might lead to greater inter-personal variation in the balance between CP's LP and PP constituents. The average person being better trained in language than music, their processing pattern would diverge less from that of a language than a music professional. [Each music theory skill increment would increase the likelihood of processing with musicological intent—of LP becoming more prominent, PP less so.] If I were to risk a generalisation, I'd say that whereas LP mayhap contributes more in Language-related situations, a bias towards PP would characterise those centred on music—there being no question of comprehending music. That's the essential complementarity of Language and Music in Song.

A quick look now at an imaginary 'Orchestral Concert'—a music-processing analogue to the Author Talk—and we'll move to song itself. Two of the Concert's three participants correspond to the Talk's audience members: there's an uncritical character with no real liking for tonight's genre (their ticket was a freebie) and an avid concert-goer with quite a lot of music theory under their belt. The third participant is a long-standing member of this renowned orchestra: a virtuoso guitarist for whom performances are all-absorbing.

As regards our first audient, I'll hazard a guess we'd be talking about low-level, noticeably PP-flavoured CP, with few demands made on LP. The second has relaxed times when they experience the music as pure emotion, and others when rationality is to the fore as they try to analyse the structure of a particular passage or the relation between instrument parts. Relative to their Language confrère, processing would exhibit: similarity in consisting of discontinuous CP; disparity as concerns relative frequency of the LP and PP interspersed with that CP. If LP was likely to be dominant for the person engaged with Language, here I imagine PP would be. As for our on-stage character, the guitarist, they'd effortlessly rise to the processing demands of listening for particulars within and between orchestral sections, keeping a close eye on the conductor and staying attuned to the course of the performance. They, as much as the author, could be capable of sustaining CP for the duration, albeit that their variant of it would probably contain a smidge more PP. The author would be choosing their words carefully; the guitarist would be relying on body and brain memory/habit.

Note that from the assumptions spelled out in this comparison, the shifting combinations of mental processing mode would be near-on indistinguishable if we could we track them for matched individuals participating in Language or Music activities. At the lowest levels of skill and/or engagement, CP would be dominant. Beyond some level of either or both characteristic there'd be more movement between CP's constituents and less time spent in CP itself; at peak levels, concurrency would be more robust, persisting through quite marked fluctuations in its LP/PP composition. But despite inter-example correspondence of CP manifestations, the situations exemplified differ in their capacity to bring CP into being—at least for their creative participants, the author and guitarist.

Think about the demands made on those two by their respective 'work environments'. Both had to respond to others in the moment—the one to their audience, the other to fellow members of the orchestra and its conductor. For the orchestral musician, this responsiveness equates to coordination and collaboration; these are part of their job—as much a predictor of an orchestra's success as the skill of its members. In contrast, the writer's would either have been a solo act or a series of two-way exchanges (questions and answers). That, too, would be typical, for their metier would usually ask little in the way of collaboration, much less coordination. The difference matters, because if, as I suppose, LP and PP must both be operative for us to be able to work well together, it would connote a difference in experience of CP; CP might also be more prevalent. To be clear, what confers this CP advantage on the guitarist is the hypothesised event and their role in proceedings—not music per se.

Music didn't give the guitarist that advantage but had I made them a soloist they might still have had a slight CP-edge over their literary vis-à-vis. I allude to research reporting that the physical coordination required for proficiency in a musical instrument broadens the range of cerebral regions recruited beyond those required for music cognition. The wider the range of regions recruited by an activity, the greater the prospect of LP/PP processing simultaneity (and hemispheric equipoise). No 'in principle' impetus to simultaneity would flow from the acquisition of a comparable level of competence by a literary creative (although a semblance of it might from the substitution of keyboards for pencil and paper). Factor in 'bulk-delivery' with collaborative music making, and the full CP implication of the orchestral example becomes apparent.

Returning to the co-ordination and collaboration I said they were critical to orchestral success, they depend on the ‘true listening’ mentioned in Chapter 1, what Philip Tirpak calls ‘effective’ listening. His ‘effective listener’ is:

> “… somebody that takes a step back, that allows the other to speak, that gives their full attention, that hears the message with their ears, with their heart, with their mind, with their emotional intelligence, that suspends judgement and makes a connection with the other individual.”[31]

If I wrote instead “… somebody who steps outside the self” you’d have the collaborative musician as effective listener. I see them as being proficient in the real-time integration of more usually opposing states— active/passive, rational/emotional, receptive/creative, leading/following: in working ‘as one’. That sets music apart from language.

The last observation I want to make is a flash back to the beginning of this section, and concerns a fundamental difference in the divide between author or guitarist and the ‘average person’. Musicality is differentiable as ‘musical receptivity’ and ‘musical creativity’. The former is the ability to perceive music (to sense differences in, for example, pitch and rhythm), the latter the ability to reproduce and create music. Musical receptivity is a near-universal attribute. Musical creativity isn’t naturally exercised by most people. Very few of us therefore experience the degree of CP enhancement that comes with creative music competence. With linguistic ability, no such distinction is ordinarily made; as active users of language we’re all (at least minor) language creatives.

Theoretically, the capacity to be a music creative is no more restricted. Many (perhaps most) of those who consider themselves ‘unmusical’ probably have a capacity for musical creativity which could be developed with appropriate training. In *Musicophilia*, Oliver Sacks remarks on the dissimilarity of musicality between people with Williams syndrome and individuals with autism characterised by ‘savant talent’.[32] The musicality of the former is described as passionate, expressive and social, that of the latter as more technical and uninfluenced by the presence or absence of others. I’m inclined to characterise the hyper-logical strengths of these savants as IQ-oriented and the acute emotional sensitivity of Williams people as EQ-oriented.

[That shouldn’t be taken to suggest a difference in hemispheric dominance between these two populations: Sacks tells us the primary difference in the brains of those with Williams syndrome is the decrease in size and weight at the back of the brain (in the occipital and parietal lobes) and sometimes super-development at the front (the temporal lobes).]

That extraordinary musicality should be found in individuals with such sharply-defined intelligence orientations is affirmation of music’s accessibility. Mental style is no barrier—and neither is age of initial exposure to music.

Oliver Sacks again:

> “But while there is a fairly well-defined critical period for language acquisition in the first years of life, this is less so for music. To be language-less at the age of six or seven is a catastrophe (it is only likely to occur in the case of deaf children given no effective access to either Sign or speech), but to be music-less at the same age does not necessarily predict a music-less future.”[33]

Sacks recounts case studies of individuals who've come to have respectable instrumental ability late in life. For one of his patients, this was in response to sudden onset Musicophilia (love of music) consequent on trauma. A second grew up with scarcely any exposure to music (even on the radio) and wondered why people were interested in it until, as a teenager, he suddenly found himself fascinated by the acoustics of vibrating strings. Nonetheless, it may pay to start young.

Levitin strikes a cautious note, telling us that whilst "the brain's music system appears to operate with functional independence from the language system" and (along with mathematics) has an "extended window", the critical period for acquiring new skills isn't unlimited. It seems that those beginning music lessons after about age twenty can't trust to ever "speaking" music as might the person who studied it at an early age.[34] Happily, he reassure us that children can develop music processing capacity with very little training.

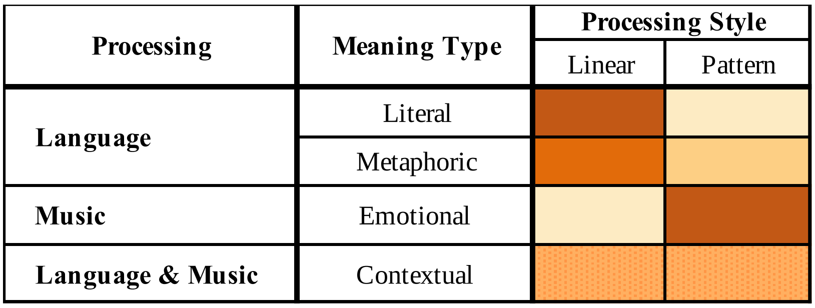
Now to Song. I'll centre my demonstration of Language and Music complementarity on unaccompanied Group Song forms (such as ACCH). In earlier foreshadowing that, I touched on the possibility Choral Harmony's cross-cultural appeal might be too restricted for it to function as the tool of integrated decision making envisaged. Here, I'll further acknowledge that even in the West where Choral Harmony has deep roots, many people are uncomfortable singing without instrumental backing, or find it less rewarding. I'll also concede that, with today's web access to backing music, lack of live accompaniment isn't the constraint it once may have been.

Nevertheless, the A Cappella form has a beauty born of unity in diversity and simplicity in complexity. Accompaniment may also camouflage a neglect of vocal blending; captivated by the beauty of the accompaniment we may fail to listen closely to our fellow singers or appreciate that we, ourselves, may have gone astray. Besides, the omission of accompaniment lightens the expository load without significantly altering the processing relativities picture I'll paint.

3.5 Mental processing in Song

The range of Western song forms has vastly expanded over relatively few recent human generations. Today, genres abound and vary hugely. For many, pitch and melody are important. In others, such as rap, the dominant musical components are rhythm and/or tempo. And in some, such as the songs of Meklit Hadero, or beatboxing, where there is vocalisation but lyrics may be almost non-existent, it's stretching the term to call them song. Since we have rhythmic Song without melody, and melodic song that is wordless, there can be no 'representative' song form. It's important to note, therefore, that when I refer to song, I'm speaking of forms which utilise the lexicon of language (though they may virtually ignore the latter's grammatical rules) and in which pitch and melody are elemental.

Amongst those, forms I will, as I said, be working with ACCH; it's the form to have in mind when reading Figure 8 and related input (so reference to Music is to that of the voice).



Processing	**Meaning Type**	**Processing Style**	
		Linear	Pattern
Language	Literal	█	░
	Metaphoric	▓	▒
Music	Emotional	░	█
Language & Music	Contextual	▨	▨

Figure 8—Song: Meaning and Processing

As you'd have thought, the figure presents as an amalgam of those for Language and Music—with this difference, that Language now also contributes to Contextual Meaning. In practise, processing of sung language is likelier to occur in a metaphorical state of mind than is processing of prose, a factor which could curtail LP's role in Song. PP, on the other hand, would be no less active in decoding musical meaning whether the voice be human or instrumental. The LP/PP proportionality within CP would likewise be modified by these (Language or Music) variables: disposition toward analysis or synthesis; sensitivity to non-verbal messages; competence (knowledge of music theory and the language/dialect of the lyrics); familiarity with the style of song; acquaintance with the song itself; engagement (active or more passive); and role (listener, performer, director).

So far, so good. However, Song isn't processed as 'Music + Language'. It imposes the processing demands of activities ruled by contrasting cognitive modes (LP and PP), but does so without prejudice, so to speak. Perhaps that 'joint' processing explains why Song is perceived as a whole, a unified sound and source of meaning. Think of what transpires when you try to remember an old song. If you're anything like me, you're liable to falter if you attempt to only recite the lyrics or hum the tune but surprise yourself with how much you can recollect by launching, almost unthinkingly, into song (mentally or aloud). Its storage as a sort of composite auditory 'image' (perhaps accompanied by a thought, feeling or visual image if it's a special song) could, in turn, partly explain why some dementia patients who've lost memory of speech are nevertheless able to recall song lyrics.

Be that as it may, a change in any of a song's elements (words, but equally pitch, rhythm or tempo) changes the song. What effect the change has will depend on the magnitude of the adjustment made and vary between individuals. Take the example of a key change: while the middling singer wouldn't see it as more than a minor hurdle, and a professional would take it in their stride, for someone with perfect pitch, no matter their level of competence, it can be tantamount to introducing a new song. Song's holism casts it as the survivor of that early muso-language through which our ancestors strove to make and communicate sense of the world. Their processing in that endeavour was concurrent. Song is our readiest means of access to CP.

A Song-processing illustration follows. I've made it a performance by a visiting (A Cappella) choir, and again we have three participants. Two are listeners with contradistinctive degrees of engagement and competence. The third, a passionate and accomplished singer, is on stage. Starting with the most passive participant, their processing, like that of their Language and Music peers, is predominantly concurrent and sub-conscious. But if CP is stretched only so far as is necessary for perception of music and language as song, within it, LP and PP would be working in tandem, contributing in a more nearly equal manner than when processing, in particular, Language, alone.

The more active audience member, fascinated by various aspects of the performance yet lacking depth of experience in the genre, would probably swing between conscious attention to specifics and unconscious absorption. Once more, that is, CP would be intermittent. However, as for their co-audient, there's a fair chance it would be close-on balanced. Completing this example is a singer who unites vocal technique and sensitivity to the Choir Director's guidance with commitment to the intra-part blending and inter-part harmonisation that is the soul of ACCH. Attunement to fellow singers is automatic; they're barely cognizant of the adjustments they make as they finesse their output in response to the unfolding, multi-layered structures of the performance. [In my experience (of 'community choirs'), no two sessions (rehearsals or performances) are ever quite the same. A host of things can shade them unpredictably: errors of commission and omission; the event (its purpose, location and format); the weather; the Director's mood; which of the usual crew are present; audience reaction; and singer attitude. That last has its most pronounced effect within parts, where each singer's comportment affects that of each other.] This sets the third-tier participant up to share with our guitarist the CP stimulus which co-operative participation adds to that conferred by engagement and skill.

Thus the following similarities and differences emerge from my comparison of Song with Music and Language when three factors are varied: engagement, competence and coordination. All three activities would share the basal CP pattern associated with an increase in those factors: continuous low-level; intermittent; continuous and advanced. However, the pattern would coincide with dissimilar LP/PP ratios, and the activities would differ in their ability to catalyse the ideal CP form: continuous and advanced.

In the latter respect, orchestral musicianship would pip writing. The musician's advantage was ascribed to coordination—with other musicians and of the cerebral hemispheres. The choral singer, too, would have been ahead of the writer, working as they were towards ensemble functioning. Moreover, although the singer hadn't the musician's manual source of CP stimulation, singing has been called a 'deeply embodied activity'[35]; control of breath and the vocal apparatus are non-negligible demands that would have roped in extra brain regions—demands which come on top of those placed by simultaneous processing of language and music. Singing borders on simultaneous vocalisation in two languages: verbal/reasoned and musical/emotional. This dual use of communication forms with non-identical patterns of brain activity or hemispheric dominance makes it more likely song would entrain neural networks specific to reason and to emotion—concurrently. I put it to you that, all up, the chorister's activity would provide a CP fillip equivalent, at a minimum, to that obtained by the orchestral musician, and better balanced besides.

Remark too that whereas song hardware and software are built into humans, instrumental music-making calls for an external object and an awful lot of effort to play it with any degree of skill. That points to song coupling musical appeal with greater accessibility than instrumental musicking. It also leads me to believe song forms such as Choral Harmony could, sooner than music detached from language, mature CP sufficiently for it to be a useful skill—sooner than through any other field and, tellingly, without it being necessary to first build an appreciable level of skill.

The purpose of comparing Language, Music and Song, I should remind you (given I've strayed so far from the point), is to round out my contention that enhancing CP would lead to wiser decisions. But CP isn't the end of Choral Harmony's decision-making benefits as I see them: other facets of participation in it could smooth conversion to flatter, more inclusive structures.

I'll give you two examples. First, for an inexperienced vocalist, it can be a big ask to lend an attentive ear to the interlacing of parts as well as to other singers within their part. Attend to another part, and they may drift towards it (be unable to 'hold' their own). Block it out, and the unity which makes a choir more than the sum of its parts dissolves. What choral harmony teaches is the ability to listen attentively and adjust, but only as necessary. [There's a distinct parallel between not being swamped in the choral context and not being overwhelmed by empathy distress.] Second, within choirs, the 'lead' changes with the song. Although melody lines are, a great deal of the time, written for the Soprano vocal range, all choristers must be ready to sing harmony to another part's lead. It's a fair assumption that such training could help broaden the perspective of those a little too ready to demonstrate what they believe to be the hallmark of a genuine leader: capacity for solo decision making. The task facing the empathic decision maker is to neither block the other's point of view nor be irresolute; they must maintain a flexible approach to leadership—be comfortable taking, and ceding, the lead.

I'll finish by pulling together the main arguments for a Group Song-tool, as they've surfaced during discussion of the cognitive processing of Language, Music and Song.

3.6 The advantages of Song-based CP: reinforcing key points

Many fields incubate CP; at its most advanced, it's a marker of mastery. However, whether it develops beyond some base level—and, if it does, when and to what level—depends on a range of factors. In exploring the scope for CP training through Language, Music and Song, I treated it as being, dependent on five variables. Three, I'll term 'personal': degree of engagement, level of competence and nature of participation (more active or passive). The remainder are 'activity-related': requirement for interpersonal coordination and any supplementary physical or mental challenge presented by the enterprise.

On the basis of particular combinations of those variables in my Language, Music and Song examples, I drew these conclusions. Considering only Language and Music, the musician's skill, focus and active participation in a collaborative endeavour demanding complex manual skills and a significant degree of cerebral hemispheric processing symmetry was, I said, most apt to induce close-to continuous, high-level CP. Now bring in Song, the merger of Language and Music—those two equal-but-different (complementary) activities. Where four of the five variables are concerned, I asserted that the ACCH singer and musician differed only with respect to the second of the activity-related variables, and that the challenge facing the singer—co-engagement with Language and Music—should make ACCH a match for instrumental musicking. However, if ACCH is to be promoted as an enhancer of decision making, it must be capable of outperforming other forms of musicking, be better able to establish concurrency in brain processing style—with all that implies for integrated (empathic, as well as rational) decision making, globally. I reasoned that two aspects of Song make this so.

Accessibility is one. ACCH shares the broad appeal of music while limiting its demands to what we come into the world equipped with: a voice. Asking so little, it doesn't discriminate, not on the basis of age, gender, nationality, location, economic circumstance, processing style or anything else. This democratic aspect of song—the absence of prerequisites to participation—is an absolute condition of my faith in its ability to furnish a simple, inexpensive, enjoyable and effective path to integrated decision-making. It broadens the ambit of proximity (which, if I'm correct, is positively correlated with empathy when choosing) and allows for song's CP growth-inducing influence to be active in relative beginners.

The other is the stronger connections ACCH seems capable of forging between the neural networks having to do with reasoning and emoting—in exercising IQ and EQ. Both reason and emotion must be consulted if we're to enact inclusion, and Group Song-developed CP seems more likely to manifest as a state of mind able to simultaneously entertain their potentially dissonant promptings. Why? The answer has three parts: self-expression, the nature of engagement and filtering. I'll run through them in a moment; first I need to return briefly to Benzon. I noted his suggestion that an altered state of consciousness I likened to CP might be indicative of a pause in self-talk. That could be taken to imply that the presence of language in song would result in processing biased towards the linear, but I don't believe it would. Due to song's 'holism' language can be maintained in mind without calling forth the inner voice said to give rise to our sense of ourselves as individuals.

Now for those three parts. In the matter of self-expression, the vocally-nuanced use of language in song might dispose us to more expressive communication—make us more willing to allow our voices to express emotion and use more emotionally-nuanced language—and aid extension of language's reach. These aren't trivial points. Research indicates that older males—who comprise by far the majority of organisational decision makers—may be significantly less willing and/or able to convey their emotions openly than either younger folk or females.[36] To the extent that reluctance/inability on the part of older males can be attributed to an upbringing which admonished them to suppress feelings, enjoyment of music may be one of few opportunities they have to freely experience emotion. Music arouses emotion and, by alerting us to the contribution its emotional undertones make to our enjoyment of it, might increase recognition of the importance of feelings. Since we attach names to what's most important in our lives, that could encourage enlargement of our emotional vocabulary. The increasing use of language to express emotion might then accustom our brains to holding feelings side-by-side in mind with thoughts. [Susan David notes that labelling our emotions more accurately allows us to better understand their cause, putting us in charge rather than the emotion.[37] That would help us manage difference empathically as well as reasonably.[38]]

Engagement enters because it affords: experience of diversity in action; training in what co-operation necessitates—listening/producing, leading/following; and (what is inherent but liable to be overlooked) an economy of scale in delivering CP. Although the same also holds good, in some measure, for collaborative instrumental musicking, Group Song (Choral Harmony) does these things in the presence of language.

Filtering takes me back to Chapter 2 and neo-cortical filters. I intimated there that if we could overcome our bias towards IQ we might, in becoming more receptive to what EQ may offer, come to see that nothing is ever black or white but a shade of grey, and more fully comprehend the ethos which produced the concept of sustainability. I also noted that our exclusion of subjective information from the verbal stages of decision making is often an unconscious act.[39] Since there's no causal agent for emotions aroused by song (they stand alone, unencumbered by direct association with past experience), development of Song-based CP might reset our filters. It's conceivable that relaxing them would allow the passage of information which formerly would have been inhibited as non-rational or disruptive—vouchsafe its acceptance as integral to the object of interest, a non-threatening part of a relevant whole. That could have us attending equally to non-factual (emotional) and factual (rational) information—discriminating less on the basis of acquired 'knowledge'.

The inkling that some restrictions on stimuli entering consciousness could be lifted receives support from various current research efforts. Ordikhani-Seyedlar envisages a computer game (a Brain-Machine Interface) that trains people with ADHD to develop tighter filters.[40] And Eagleman's work on 'sensory substitution' has him talking about getting the brain to "unlock the pattern that allows it to figure out what 'multidimensional' data mean"—instead of using analysis to make some sort of conscious sense of data from many variables.[41] Could the shape of Song-based CP make it the key for Eagleman's lock—open the door of consciousness to EQ insights, and facilitate their conversion to expressible IQ inferences? As feedstock for innovation, the resultant fusion of information types would shed new light on old issues and provide a springboard to more creative imaginings of the future.[42]

Those are the features of Group Song I think could make the difference between CP and IP—CP transferrable to group (language-based) problem solving and decision making. They are the reasons why I believe song is a source of untapped potential deserving open-minded (and open-hearted) interrogation. That shouldn't be taken to signify dismissal, as unfruitful, of other CP and IP stimulus sources. Many activities naturally evoke CP; it may well arise in response to creative decision-making techniques aimed at activating EQ and I acknowledge the value of the latter as complements. However, given (in particular) they are usually reserved for a fleeting phase of the intelligence-gathering arc, I see little scope for permanent, portable gain—IP—to come of their use.

Despite these advantages to song-based CP there's a caveat on my assertions: it's volition. I've gone to some lengths to explain why processing wouldn't be unaffected by the way we engage with language, music or song—that the more active our participation, the more intensive and extensive the brain response we could expect. However, another aspect of engagement is indispensable to realisation of song's CP-potential: whole-hearted engagement. The role I see for song is dependent on the inclusiveness of its group forms, and a single member holding out—not genuinely collaborating—is enough to prevent the full benefit being actualised by and for all. It bears repeating, that collaboration is as much about listening attentively to others as it is about producing sound oneself—and infinitely more than hearing.

The obvious final matter to be addressed is IP. Assuming both the focal CP and Group Song's 'supremacy' in inducing it could be proven, that might remain a curiosity unless there were also conclusive evidence of IP—that habituation to CP through Group Song would tend to its actuation in unrelated spheres.

The next section therefore probes the IP conjecture—my impression that Group Song-built CP could work across the decision-making and problem-solving boards to optimise outcomes.

3.7 Permanent and portable CP: IP

The postulate is that engagement in song could so habituate our brains to balanced CP that it eventually became our default processing style—IP. If song-induced CP can't reach that point (is a transient phenomenon) my line of inquiry is without substance—that is, song couldn't achieve even the limited stimulus to creative, inclusive problem solving and decision making of existing methodologies such as those I acknowledged earlier.

I'm confident that it can—can evolve into IP, can become 'permanent and portable'—because the nature-nurture feedback loops first mentioned in Chapter 1 (or something of the kind) are, to all intents and purposes, inevitable given experience-mediated neural plasticity. Throughout life, the brain changes as a result of the twin processes of neuron genesis (neuronal cell creation) and neuron apoptosis (neuronal cell death) and the acquisition of experience instigates both. As experience broadens, new connections are formed between neurons (the richer and more varied the experiences we gather, the more complex) and neuronal webs no longer called on to carry out their former functions are pared back or converted to another purpose. [His work demonstrating this brain plasticity was what won Dr Eric R Kandel the 2000 Nobel Prize in Physiology or Medicine. Via his work on the neurobiology of memory, Kandel demonstrated that learning is consequent on gene activation resulting in chemical signals which alter the structure of connections between neurons.[43]]

Cross-cultural facial recognition is a case in point. Newborn infants demonstrate equal facility in distinguishing individuals from ethnic groups that have widely differing facial characteristics—Caucasian, Semitic, Australasian, Negroid and Asiatic, for example. However, this capacity begins to narrow after only a few months, as networks are pruned to those associated with recognition of the facial types dominating the baby's experience. Something similar occurs with language and music. Rapid neural development during the first years of life equips us to acquire any of the world's languages or musics. Gradually, brain wiring comes to reflect what we've been most exposed to in those early years.[44] [The 'use it or lose it' dictum isn't limited to our bodies!]

As a matter of fact, many brain areas in both cerebral hemispheres kick in during most activities and much of the brain is geared to handling stimuli transmitted by multiple senses. The brain is innately 'multi-functional'—a generalist. That's not to say areas of functional specialisation don't exist, just that they're incomplete. Nicolelis puts it like this: "… regional functional specialisation of cortical areas, initially determined by the way the cortex was built during early development, is probabilistic."[45] That means, he continues, cortical areas never fully commit to a particular function and certain changes (bodily constraints, modifications in experience or increase in task demands) readily cause a reallocation of functions across the cortex.[46] Failure to commit is what permits conversion (the brain's third option), and with it fresh opportunities.

Note, for instance, the following. The naming of the auditory and visual cortices attests to a significant degree of specialisation between those areas. Specialisation is also in evidence within them. Thus research shows the left auditory cortex does more of the work in decoding the speech and language aspects of sound, while the right auditory cortex is more active in processing any melodic component.[47] Yet the visual cortex may react to other than visual signals and, in particular, to auditory cues. For example, Daniel Kish, who is blind, can set off a response to 'flash sonar' signals in his visual cortex: he emits clicks and the rebounding signals enable him to see—principally the three-dimensional structures around him. His sonar works as well behind him as in front, around corners and through objects, and his hearing has become super-sensitive.[48]

Birbaumer proffers several other examples of the opportunity in neuroplasticity. He tells us it's been exploited to advantage in settings as disparate as: training (gaoled) psychopaths to feel fear; teaching epileptics to predict an event and reduce its severity by voluntarily regulating their brain's activity; and retraining the paralysed muscles of stroke victims to respond to brain prompts to move.[49]

Most of us would recognise from our own experience of habits—their formation and the difficulty of breaking them—that the brain continues to learn and is capable of relearning through repetition. From research into addiction we know that it's a tall order to break a destructive habit without changing the environment within which it was acquired, and just about impossible where there's activation of the brain's pleasure centres.[50] On the flip-side, positive habits formed in an enjoyable setting will also prevail. By maintaining CP could become permanent, I'm therefore doing two things: assuming any region of the brain could profit by (or suffer from) the strengthening of connections behind habit formation; and surmising that regular engagement with song would increase the extent to which neurons in regions connected to empathy and reason fired together. If it should pan out that the latter is correct, song could be presumed to consolidate structural connections between empathy and reason, making CP a constant.

If permanence is one side of a coin, I envisage portability as the other. That is, whilst there can be no certainty, the presence or absence of song should be inconsequential once a CP-habit was in place. Carry-over could only be excluded if there were no overlap between the brain areas engaged by inducing and benefitting activities. Yet we know that all complex activities and personality traits consist in functional integration of heterogeneous and widely distributed neural networks. Moreover, song and my primary concern, decision making, are usually language-based, making a partial intersection, if nothing else, inevitable.

[NB: This short section has left many matters unaddressed. Some, must remain so: for instance, how the parameters of individual processing style might affect the CP evolutionary path—it's transmutation into IP. Others, of a more pragmatic kind, have been left to later reflections on the overall practicality of what I'm proposing.]

With this chapter I've tried to persuade you of the potential in Choral Harmony to improve decision making.

For that purpose, I advanced a framework built on the existence of four cognitive processing states, two of which were novel: CP (simultaneous LP and PP) and IP (permanent and portable CP—CP as a skill transferable across arenas in life). I then explained my reasons for believing that Group Song could be turned to inducement of IP. They centred on the mental processing complementarity of the song-form's components and its collaborative nature; it fosters cognitive integration in a collaborative environment. Concurrent processing of emotionally- and rationally-sourced information (CP/IP) should go some way towards redressing a reason-empathy imbalance in much decision making. Moreover, since, Group Song permits multiple individuals to simultaneously acquire CP, it increases the chances of achieving the critical mass of decision makers with IP on which real improvement in *group and/or public* decision making is reliant. My concluding section ran through the elements most accountable for my resolution to plough on—search the scientific literature for probative pieces on cerebral structure and function pertaining to empathy and/or music.

Chapter 4 is given over to the results of that search—scientific validation distilled from a selection of heartening studies.

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[1] I'm aware that 'non-thought' has been coupled with 'non-human' and used in contradistinction to the pairing 'thought' and 'human'. That's not a debate I want to enter into.

[2] Oliver Sacks tells the story of Joseph, an eleven-year old who'd been born deaf and never taught language (of any sort) yet left one in no doubt he perceived in a way which implied thought. Sacks O, *Seeing Voices; A Journey into the World of the Deaf,* London, Pan Books Ltd., 1991.

[3] In developing that aside, I was reminded of these extracts from *The Prophet*—perhaps the most famous work of the poet Kahlil Gibran—which suggest thought precedes language but also nicely captures the latter's limitations. 'I only speak to you in words of that which you yourselves know in thought. And what is word knowledge but a shadow of wordless knowledge.' Or 'And in much of your talking, thinking is half murdered. For thought is a bird of space, that in a cage of words may indeed unfold its wings but cannot fly.' However, the opposite perspective (put in David Christian, *The History of our World in 18 Minutes*. TED2011, March 2011) is of language as a system of communication so powerful that precise information can accumulate across time, and be shared in space, connecting billions of individuals to make of our world a single, global brain.

[4] I have in mind play as catalyst to new and creative ideas. It's no coincidence that we speak of a task as being child's-play for someone who's mastered it; play leads to mastery and masters play. There's also the kindred 'sidelong-glance' method of accosting problems in complex situations.

[5] Research shows the optimal approach to complexity isn't head-on and focused but tangential and diffused. Tim Harford reports results from testing of Harvard undergraduates, some of whom had good "attentional filters" (were able to concentrate during, for example, lectures) and others whose filters were weaker (struggled to exclude external information, the sights and sounds of the world around them). The evidence suggested that the "porous" filters of the latter group actually redounded to their advantage in creative pursuits: they'd a tendency to relate the central material to other concepts, bringing in new dimensions and identifying patterns. That is, distractions provided "grists to their creative mill". Tim Harford, *How messy problems can inspire creativity*, TEDGlobal, London, September 2015, quoting the results of testing undertaken with Harvard undergraduates by the psychologist Shelley Carson.

[6] Benzon, op. cit.

[7] Koestler A, *The Roots of Coincidence*, London, Hutchinson & Co (Publishers) Ltd, 1974.

[8] Koestler, op. cit. Today, of course, brain-mind-interface experiments are routinely conducted by mainstream neuro-scientists who, in consequence of their findings, would no longer refer to such experiences as "paranormal".

[9] Jonathan Haidt, *Religion, evolution, and the ecstasy of self-transcendence*, TED2012, February 2012.

[10] This publication proceeded from a long-running collaboration between the Tibetan Buddhist community and Harvard Medical School, the genesis of which was a desire by the latter to learn more about the possible physiological effects of advanced meditative techniques. In the West, there's less awareness of what Buddhism has to say about 'the subtle relationship between mind and body' than of its monastic and messianic traditions. Dalai Lama, his Holiness the, Benson H, Thurman R, Gardner H and Goleman D, *MindScience; An East-West Dialogue*, edited by Goleman D and Thurman R, Boston, Wisdom Publications, 1993.

[11] Specifically, Thurman advises that the six tip corners of the first three fingers of each hand are attuned to twelve channels of communication from the patient's body. Dalai Lama, Benson, Thurman, Gardner and Goleman, op. cit.

[12] Bateson MC, *Peripheral visions; learning along the way*, New York, Harper Collins, 1994.

[13] Srini Pillay, *What's one of the keys to mastering multitasking? Feedback,* Ideas.ted.com, 27 February 2018.

[14] Nicolelis M, *Beyond Boundaries; The New Neuroscience of Connecting Brains with Machines—and How It Will Change Our Lives*, New York, St Martin's Griffin, 2012.

[15] Dr Niels Birbaumer, interviewed by Lynne Malcolm, *Frontiers of the changeable brain*, All In The Mind, ABC Radio National, 4 March 2018.

[16] Benzon, op. cit.

[17] Which isn't to imply that any or all of the CP analogues touched on could, or would, lead to IP. Some might, but I'm not in a position to say. If I take the example of meditation, some forms of it, especially 'TM' (Transcendental Meditation), have received a measure of support (in organisations large and small) as an aid to executive decision making. However, I'm unsure whether/to what extent practitioners must, in order to bring a meditative state of mind to bear during decision making, first choose to enter that state (which I assume would entail consciously deviating from normal thinking).

[18] Anne Curzan, *20 words that once meant something very different,* TED Ideas 18 June 2014.

19 What we know as English is actually a composite language, formed of words taken from many others (largely Indo-European); that's what accounts for its relatively large vocabulary, along with its proclivity for creating compound words— 'gangbuster', 'wavelength' and 'underestimate', for example. But some of its imports later changed meaning, leading to notable 'false friendships' capable of triggering significant misunderstanding. For instance, I believe de Gaulle's use of the word 'éventuellement' once led to a mini Franco-British crisis. Recounted loosely (I don't recall the detail or precise context of the story), de Gaulle used the word in the French sense of 'possibly', 'contingently' or 'should the occasion arise'. However, it was translated or interpreted as 'eventually', hence taken by the British to convey much greater certainty than de Gaulle had intended.

20 The Second Edition of the 20-volume *Oxford English Dictionary* (OED) contains full entries for 171,476 words in current use, and 47,156 obsolete words. To this may be added around 9,500 derivative words included as subentries." www.en.oxforddictionaries.com. However, many words aren't included in dictionaries (botanical and scientific terms for example, or words that haven't yet proven their staying power). All told, some linguists believe the count may be one (even two) million. [NB: It's not always clear what constitutes a 'word' in these counts. For example, I think the OED count would include 'run' and 'runner' but not the inflected verb forms 'ran' or 'running'.]

21 The average native speaker's passive vocabulary was estimated by The Economist to be between 20,000 and 35,000 words (presumably words that would appear in the Oxford English Dictionary cited above). Www.economist.com, Johnson Language blog, *Vocabulary size, Lexical facts*, 29 May 2013.

Caroline Gall writes that Professor David Crystal (British linguist, academic and author) considers "a person's active language will always be less than their passive, the difference being about a third". Caroline Gall, *The words in the mental cupboard*, BBC News Magazine, 28 April 2009 (online).

The 3,000 words estimate is from: www.lingholic.com.

22 That is, I'll be limiting consideration of metaphor to a 'traditional' perspective. Recent research: views it as a feature of thought, or of Language and thought; and/or examines the extent to which it's part of, rather than separate from, ordinary everyday use of Language.

23 English is reckoned a weakly-inflected but highly syntactical language. Relative to other European languages (especially German), inflection serves few purposes and a few types cover most cases but word order is important to meaning (much more so than in a language like Finnish).

24 'Musicking': from Benzon's non-specific verb 'to musick'. Benzon credits Christopher Small with having coined the verb *to music*, defining it as: "… to take part, in any capacity, in a musical performance, whether by performing, by listening, by rehearsing, or practicing, by providing material for performance (what is called composing), or by dancing." [Benzon, op. cit.] I use it in generalising to both vocal and instrumental music.

25 In linguistics, a morpheme is the smallest meaningful unit of language. For example, the word 'incoming' can be divided into three parts: 'in', 'com(e)' and 'ing'. Each part is indispensable to the meaning of the word, and all meaning in context would be lost if it were further broken down. Note that a morpheme may, or may not stand alone/have a meaning on its own (thus 'in' or 'come' but 'ing').

26 On the latter point, Music contrasts with Language. As alluded to in the discussion above, some compliance with accepted word order (perhaps only as culturally determined) is necessary for Language to make sense.

27 I note, however, that drums have long been used in a number of countries to transmit quite complex messages over great distances.

[28] Davies S, *Musical Understandings and Other Essays on the Philosophy of Musi*c, Oxford Scholarship Online, January 2012.

[29] Robinson, Jenefer, Abstract, *Can Music Function as Metaphor of Emotional Life?*, Revue française d'études américaines, No. 86, Aspects de l'esthétique américaine, October 2000, pp. 77-89.

[30] There are musicians for whom the reverse is the case: Meklit Hadero perceives the music in the metaphor. [Hadero is a singer-songwriter for whom the everyday soundscape—birdsong, rattling pots, wooden floors creaking and groaning, pipes clanking, the melodic nature of her native tongue (Aramaic), even the sighs, rustles and whispers of her audience—is a major influence.] Meklit Hadero, *The unexpected beauty of everyday sounds,* TED Fellows Retreat, August 2015.

[31] Philip Tirpak, guest of Antony Funnell, *Listening and Responding*, Future Tense, ABC Radio National, 28 June 2015.

[32] Sacks O, *Musicophilia; Tales of Music and the Brain,* Pan Macmillan Ltd, 2007.

[33] Sacks, *Musicophilia*, op. cit.

[34] Levitin, op. cit.

[35] Melissa Forbes, *Flow state, exercise and healthy ageing: 5 unexpected benefits of singing*, The Conversation, 14 April 2022.

[36] I have in mind research cited by Rana el Kaliouby which found that the young smile less than older people and men less than women. Rana el Kaliouby, *This app knows how you feel—from the look on your face*, TEDWomen 2015, May 2015. I wonder, too, whether difficulty in expressing emotion through words might not contribute to aggressive behaviour, that is to expression through motion.

[37] Daryl Chen and Julia Fawal quoting psychologist Susan David in *Why we should say no to positivity—and yes to our negative emotions*, TED Ideas, 8 May 2019.

[38] It could also be the saviour of some of those men (of all ages and in all positions) who we're losing because, finding it difficult to speak out about the way they're feeling, they lose the battle with mental illness.

[39] In the context of 'bounded rationality' I recently read that something like 11 million pieces of information come into our minds at any given moment but only 40 are processed consciously. Perhaps what CP does is allow access to a few more—pieces that require EQ to process. Dolly Chugh, *How to let go of being a "good" person—and become a better person*, TED@BCG, October 2018.

[40] Ordikhani-Seyedlar, op. cit.

[41] David Eagleman, *Can we create new senses for humans?*, TED2015, March 2015.

[42] "Design thinking is a process for innovation and problem solving. There are five steps. The first is defining the problem and understanding its constraints. The second is observing people in real-life situations and empathizing with them. Third, throwing out hundreds of ideas -- the more the better, the wilder the better. Fourth, prototyping: gathering whatever you can, whatever you can find, to mimic your solution, to test it and to refine it. And finally, implementation: ensuring that the solution you came up with is sustainable." Elise Roy, *When we design for disability, we all benefit*, TEDxMidAtlantic, Washington, September 2015.

[43] Eric R. Kandel, The Nobel Prize in Physiology or Medicine 2000, *Facts*, nobelprize.org.

[44] Moreover, Levitin tells us that very young babies are thought to be synesthetes: “unable to differentiate the input from the different senses, they experience life and the world as a sort of psychedelic union of everything sensory. Babies may see the number five as red, taste cheddar cheeses in D-flat, and smell roses in triangles.” Levitin, op. cit.

[45] Nicolelis, op. cit.

[46] Nicolelis has encapsulated this as his “Distributed Coding Principle”, stated thus: “Any type of information processed by the brain involves the recruitment of widely distributed populations of neurons”. Nicolelis, op. cit.

[47] Most recently, I came across reference to this ‘split processing’ while listening to *Science with Jonathan Webb: How we process music and lyrics*, on the ABC’s Radio National breakfast programme, 28 February 2020.

[48] Daniel Kish, *How I use sonar to navigate the world*, TED2015.

[49] Dr Niels Birbaumer, interviewed by Lynne Malcolm, *Frontiers of the changeable brain*, previously cited.

[50] Dr Niels Birbaumer, interviewed by Lynne Malcolm, *Frontiers of the changeable brain*, previously cited.

4
The Science

As indicated, this chapter will be largely taken up with research which I've found to be at least superficially supportive of my CP/IP claims. Two types of study are cited. One is concerned with regions of the brain which may be active when we empathise or musick (with the neural correlates of empathy and/or music); they identify target areas for stimulation where the aim is to increase empathy's weight in the decision-making balance. Of greatest interest would be areas excited by both activities. The other type of study included is adduced as evidence that increased empathic ability may be (causally) linked to engagement with music.

4.1 Study choice

For song to cultivate empathic ability, empathy and music would have to be structurally represented in the brain. Accordingly, my plan was to sample the literature, identify brain regions active as we empathised or musicked, and pinpoint commonalities. That was more difficult than I'd estimated and (as you'll see) I was obliged to pare back my ambitions.

The first point in question was the frequent, synonymous use of empathy, sympathy, altruism and compassion noted in Chapter 2. By way of example, Abigail Marsh gave a TED Talk titled: *Why some people are more altruistic than others*.[1] The research she reported had sought to understand what could explain altruistic action by comparing amygdala size. [The amygdala performs a primary role in the processing of memory, decision making and emotional reactions, being particularly responsive to experience or memory and pre-eminent for recognition of fearful expressions.] She supplied a "stringent" definition of altruism—as "a voluntary, costly behavior motivated by the wish to help another individual … a selfless act intended to benefit only the other"—and went on to nominate compassion as "a key driver of altruism". Amygdala activity in response to dynamic fearful faces was employed by Toller, Adhimoolam, Grunwald et al to test for empathy-related brain responses.[2] And in an investigation of "agreeableness" by Hou, Allen, Wei et al, compassion (held by the authors to be one of its two sub-elements) was said to "reflect tendencies toward empathy, sympathy, and concern for others."[3] From that variation in use of terms I deduced it was practically impossible to distinguish between the neurological signals of closely-related attributes and so regarded studies of any or all as about empathy.

I was spared a second difficulty (concisely and accurately summarising neurological findings) by the revelation that breadth of cerebral engagement is a feature of both empathy and music. That ‘empathy centres’ should be broadly disseminated in the brain wasn’t unexpected. As noted in Chapter 1, empathy has an intellectual as well as an emotional aspect. The Music and Song ‘events’ from Chapter 3 were also suggestive of both IQ and EQ involvement.

It turns out that processing for music isn’t unlike that of our water intake—which amounts to a bit more than flushing it through a system of pipes—even when we’re ‘just listening’. A massive array of neurological systems is activated, amongst them those dealing with: the acoustic properties of music; emotion; working and long-term memory; planning, analysis, synthesis and decision making; motor control; and pleasure/addiction. If we’re listening to a song, then regions dedicated to speech processing would also be in the game, as would be visual systems should we be eyeing written lyrics and/or musical notation. And active engagement with music—playing a musical instrument, singing, composing—would bring in still other functional areas.[4]

Levitin gives a glimpse of this complexity:

> “The picture about neural organization for music was becoming clearer. All sound begins at the eardrum. Right away, sounds get segregated by pitch. Not much later, speech and music probably diverge into separate processing circuits. The speech circuits decompose the signal in order to identify individual phonemes—the consonants and vowels that make up our alphabet and our phonetic system. The music circuits start to decompose the signal and separately analyze pitch, timbre, contour, and rhythm. The output of the neurons performing these tasks connects to regions in the frontal lobe that put all of it together and try to figure out if there is any structure or order to the temporal patterning of it all. The frontal lobes access our hippocampus and regions in the interior of the temporal lobe and ask if there is anything in our memory banks that can help to understand this signal. Have I heard this particular pattern before? If so, when? What does it mean? Is it part of a larger sequence whose meaning is unfolding right now in front of me?”[5]

From that I concluded music processing runs the length, breadth and depth of the human brain, from one of its oldest structures (the cerebellum—or ‘reptilian brain’) to one of its newest (the frontal lobes), activating right and left hemispheres, the major lobes (frontal, parietal, temporal and occipital), and subcortical as well as cortical areas. More to the point, it engages regions associated with the most primitive and advanced of human cognitions (with areas active when emoting and reasoning), reinforcing its impact by exciting reward and motivation centres.

Moving from generalities to specifics, my reading had revealed that the amygdala (along with other structures central to emotion, for instance the hippocampus) was also active during music processing. Marsh (who compared the brains of individuals representative of the spectrum from highly altruistic to psychopathic) had shown that the larger and more reactive a person’s amygdala the more altruistic they were likely to be.[6] If compassion drives altruism then amygdala size would be a determinant of not only capacity for compassion but (voluntary or involuntary) use of it. Add my assumption of a working equivalence between compassion and empathy, and the inference is that propensity to act empathically is related to amygdala size.

I wanted to know which way causation ran. Marsh clearly sees it going from brain to behaviour, but I wondered whether it might not be bi-directional? You’ll recall that (as noted above) music has been observed to activate cerebral structures subservient to empathy, including the amygdala. Research into Choral Harmony as an empathy-enhancer might be justified if it could be shown that by generating such activity it increased amygdala size and with that empathic leaning. That amygdala size can be increased, we know from Sapolsky: he tells us it's responsive to stress and trauma—that at any age, a few months of stress and trauma is all it takes to enlarge the amygdala.[7] Concurrent atrophication of the frontal cortex also occurs. The front part of the frontal cortex (the pre-frontal cortex) has executive function. If the frontal cortex has been compromised, so too will be our ability to rationally check-in on the rapid verdicts reached by a hyperactive amygdala.

On the surface, that's not encouraging—makes it seem unlikely amygdala size might be increased through what (in contrast to stress might be termed) positive forms of stimulation, those which—like music—are capable of producing the opposite, relaxing, effect. For that not to be so, the amygdala's response would need to be as strong to positive as to negative emotion. Moreover, it caused me to rethink my interpretation of Marsh's results since a stressful life would be detrimental to empathy, any increase in amygdala size it provoked notwithstanding. However, it did seem to me possible that music might calm the amygdala and perhaps improve frontal cortex functioning, both of which could reduce the competitive and/or self-protective responses which are adversative to empathy.

It was at about this point in my musing that I commenced a literature search. My original plan of attack was fairly restrictive, an embodiment of the hope I'd find studies demonstrating a statistically significant causal relation between unaccompanied Choral Harmony and outcomes disclosing the presence of empathy during decision making. Not wanting to miss germane studies on terminological grounds, or peripheral but informative material, I altered course—designed my search to encapsulate the fundamentals of the argument laid out in the preceding chapter plus a bit of leeway. Effectively, it was directed at locating an illustrative sample of research into the cognitive effects of exposure to music, preferably in contexts other than decision making and for purposes other than influencing choice, where involvement with music was active, vocal and co-operative (that is, involvement was via unaccompanied Group Song).[8] Before I go into the studies themselves, I'll run through the rationale behind the components of that compound criterion.

The substitution of 'cognitive effects' for empathy (and its synonyms) recognises that emotionally acquired knowledge and understanding may be legitimately thought of as encompassed by 'cognition'.[9] The context and purpose stipulations cover both the desideratum of sustainable decision making—decision makers pre-equipped with CP—and an awareness that, if we're to be certain of music's capacity to induce IP, inducing and benefitting activities would have to be completely independent. The involvement requisites capture a conclusion from the previous chapter—that active, co-operative engagement would be positively correlated with IP development—and my desire to isolate the effects of song per se.

4.2 Music, empathy and decision making: what the science revealed

Figure 9 maps out the literature route I'd like to have been able to travel. That is, ideally, I'd have been able to locate research which followed the solid green arrows—

demonstrated a statistically significant and positive cognitive effect (classifiable as an increase in empathic ability), on general decision making, of independent engagement in Group Song.

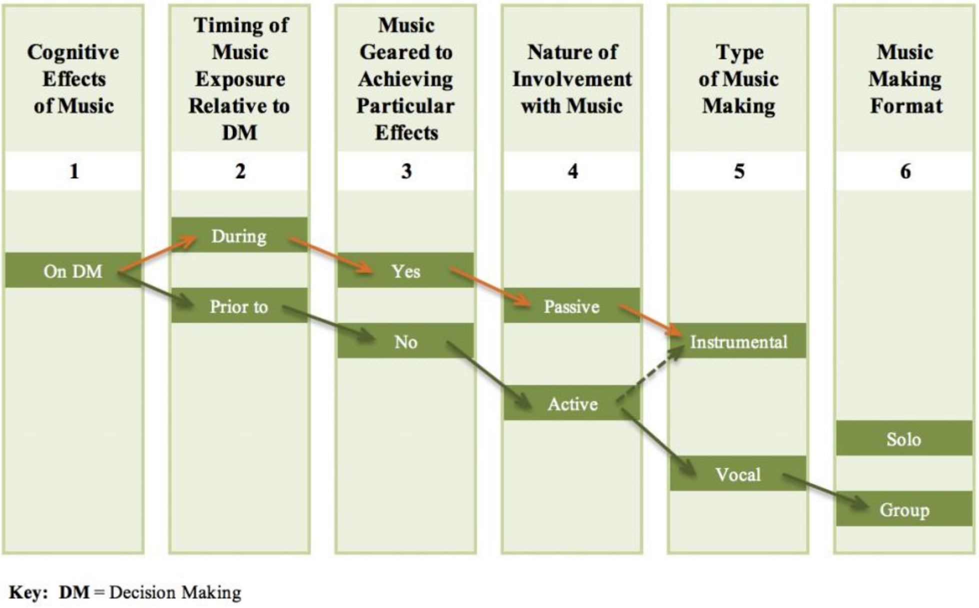
Cognitive Effects of Music
Timing of Music Exposure Relative to DM
Music Geared to Achieving Particular Effects
Nature of Involvement with Music
Type of Music Making
Music Making Format
1
2
3
4
5
6
On DM
During
Prior to
Yes
No
Passive
Active
Instrumental
Vocal
Solo
Group
Key: DM = Decision Making

Figure 9—Literature Search Focus

No such luck: mostly, the research I came across diverged as of Column 1, tracking instead the brown arrows. Typically, the methodology employed by this ‘music as environment’ research saw individuals carry out analytical decision-making tasks—usually choice under uncertainty and/or inter-temporal choice—in the presence of music (or sound). The hypothesis thus studied was whether choices made would be influenced by listening to a particular type of music, that to which participants were exposed having been chosen to bring on either a positive or a negative mood. For example, in papers given (in two consecutive years) to Conferences of the International Society for Music Information Retrieval, Liebman et al explored: how mood brought on by exposure to music during decision making affects the emotional processing of information (affects bias towards one option or another and semantic evaluation of words); and, granted music-induced mood can affect emotional and cognitive processing, how analytical processing (decision making on quantitative tasks) might be impacted.[10]

For the most part, I ignored that type of study (the control environment being too far removed from what I considered appropriate to the Song-tool I envisage) but a handful held my attention. Gerhard Hagerer quotes from a study evidencing human perception of musical instruments as “super-expressive voices”.[11] The explanation is that similar emotional cues (melody, rhythm and pitch) are used in both vocal and musical expression.[12] His own research takes advantage of that perception, seeking to augment the intelligibility of human speech by accompanying it with music generated by software able to recognise and duplicate the emotional overtones in speech. Although not originally inspired by their condition, Hagerer felt his work could be relevant to persons who have difficulty in “decoding emotions out of prosody during interpersonal communication". He was led to that conclusion by research indicating that "music additionally affects deeper and eventually less damaged or problematic brain regions than speech features".[13] [14] Research by Greenberg et al seems to endorse Hagerer's intuition.[15] For them, the acts of emotional and psychological perception, interpretation, response and prediction we engage in while listening to or performing music are very similar to those involved in empathic human interaction.

A number of studies did conform with the solid green route, up to Column 4; they then took the dashed path to Column 5—related to instrumental musicking. One was a 2013 study by Winner et al (published by the Organisation for Economic Co-operation and Development) into the impact of an arts education on thinking skills and creativity. The authors cited several thought-provoking sources, including two showing that: adult musicians have "a superior ability to identify a speaker's emotion from that speaker's prosody"; and that "children with music training detect the emotion in speech prosody better than do those without music training".[16]

Greenberg et al reference studies in the same category which showed that group instrumental musicking increases prosocial behaviour. Noteworthy among them was a study by Rabinowitch et al. It demonstrated that, if maintained over the long-term, short but regular episodes of musicking increase emotional empathy in children outside of the musical setting (in this instance, a programme of "interactive musical games").[17] Rabinowitch et al also remark on anecdotal evidence that membership of an orchestra can help break down cultural barriers by increasing empathy.[18]

It remained that I'd found no research into the effects on decision making of engagement in Group Song. What came closest was well-publicised Swedish research by Vickhoff et al into the feeling of wellbeing promoted by choral song.[19] They investigated RSA (Respiratory Sinus Arrhythmia)—the coupling of respiration and heart rate variability—as a possible physical basis for that feeling. The decision to investigate RSA was based on two observations. Choral singing coordinates the neurophysiological activity for respiration and heart rate, along with that for timing, as well as motor production, of words and melody. And RSA has a subjectively (in addition to a biologically) soothing effect which is more marked at the lower-than-normal respiration rates demanded by singing.[20] The results obtained confirmed the authors' a priori expectation of a calming effect on the heart, though there was surprise at the speed with which heart rates synchronised (external synchronisation with melody and rhythm was mirrored internally).[21] They comment that this effect, since mediated by the autonomous nervous system, is hardwired, so universal. However, they also note that it was most marked when the choir sang *in unison*.

In addressing the import of their work, Vickhoff et al likened the combination of calm and activity they'd identified to the "focused interest during maintained control" that typifies mental "flow", remarking that social engagement is optimised by a similar pairing: a stress-free environment and motivation to participate. They speculated that if "external and visible joint action corresponds to an internal and biological joint action" then so could the reverse (proposed in earlier work by Vickhoff and others) hold that joint action leads to joint perspectives and/or intentions. Or, as they then put it, that "singers may change their egocentric perspective of the world to a *we-perspective* which causes them to perceive the world (religion, politics or football team) from the same point of view and thus defines who *we* are." [Italics in original.]

The final study I'll mention, of active participation in instrumental music-making, led its authors to be inquisitive about decision making in musical and non-musical environments. [A path for it couldn't be mapped onto Figure 9 without loss of clarity.] I was alerted to its existence by a Vanderbilt (University) News article headed: *Musicians use both sides of their brains more frequently than average people*. The article covered research conducted by psychologists Gibson, Folley and Park who had examined creativity in a particular group of creative individuals—instrumental musicians—and a matched group of control participants.[22] Evidence of differences in brain structure and functioning between musicians and non-musicians prompted the researchers to ask whether trained musicians might not show increased creativity in non-musical tasks as well. Their finding? Musicians and non-musicians don't make decisions in the same way; their brains function differently, with those of musicians tending towards more widely distributed cerebral engagement—exhibiting increased "divergent thinking".

In respect of problem solving, divergent thinking is defined as the opposite of convergent thinking (with its progressive narrowing of the solution space). For Gibson et al, it "involves flexible ideation to generate many responses to open-ended and multifaceted problems" and "is best suited for poorly defined or unstructured problems". The surpassing divergent thinking skills exhibited by musicians weren't offset by any relative weakness in convergent thinking (which "works best with well-defined problems that have a clearly defined response"); in some tests, musicians performed better than non-musicians on that score too.[23]

As to the origins of that broadening tendency amongst musicians, the authors opined they might lie in the level of inter-hemispheric coordination and co-operation imposed by bimanual dexterity. All musical instruments exact of the performer the ability to centrally integrate the motions of the two hands over time, so training in a musical instrument may enhance recruitment of both hemispheres.[24] It was further noted that musicians must be adept at interpreting written music, which takes concurrent use of the cerebral areas actuated by both language (written music) and creativity (interpretation)—but also, I'd imagine, both linear and pattern processing. [The ability to read music hasn't figured to this point because, like musical accompaniment, it's an unnecessary complication in my argument for Choral Harmony.] All up, it was suggested musicians might be "particularly good at efficiently accessing and integrating competing information from both hemispheres."

[NB: Levitin observed that Schlaug had found evidence of differences between the brains of musicians and non-musicians, the most notable (from my perspective) being a tendency for the former to have larger front portions of the corpus callosum and cerebellums, as well as an increased concentration of 'grey matter'. The corpus callosum is identified as "the mass of fibers connecting the two cerebral hemispheres"; the cerebellum as "the part of the brain that is involved closely with timing and with coordinating movements of the body"; and grey matter as "that part of the brain that contains the cell bodies, axons, and dendrites" and is "understood to be responsible for information processing"). [25]]

Thus, if my search didn't uncover quite what I'd hoped for, neither did it persuade me of error in my conviction that Group Song has promise as a change-agent for decision making—rather the opposite, as the next section will show.

4.3 Recapping the influences

Figure 10, in grouping the most directly relevant of the above studies with earlier mentioned factors, shows the make-up of that conviction.

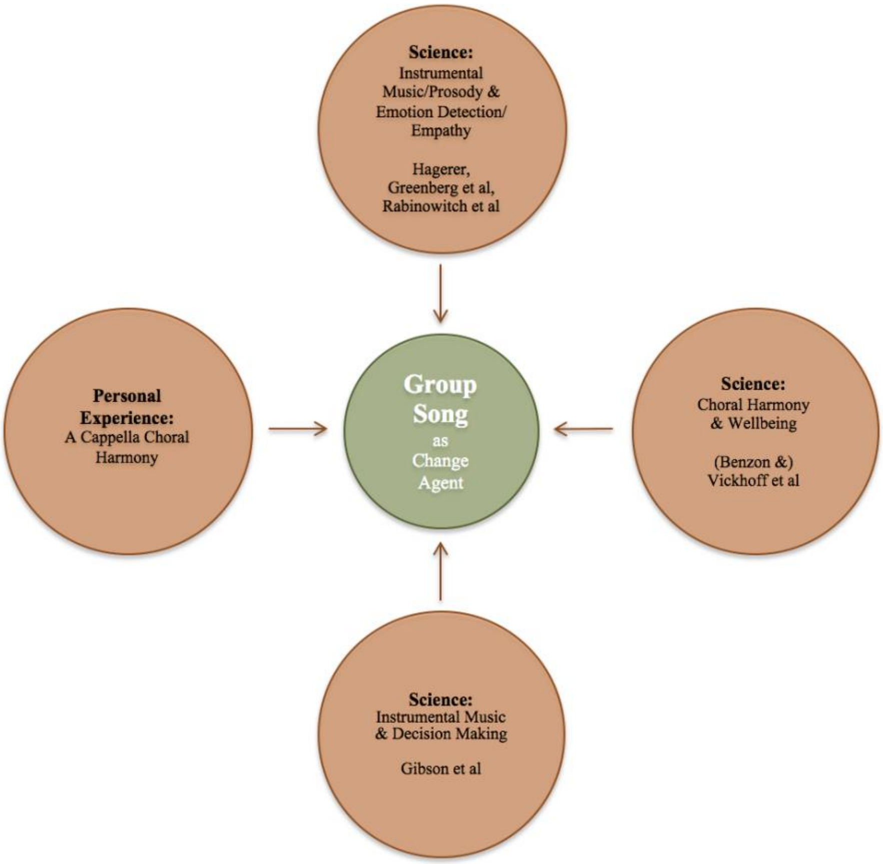
Science:
Instrumental Music/Prosody & Emotion Detection/ Empathy
Hagerer, Greenberg et al, Rabinowitch et al
Personal Experience:
A Cappella Choral Harmony
Group Song as Change Agent
Science:
Choral Harmony & Wellbeing
(Benzon &) Vickhoff et al
Science:
Instrumental Music & Decision Making
Gibson et al

Figure 10—Concept Influences

Starting at the top, we have a cluster of instrumental music studies. What I drew from them was that prosody and music bear a strong resemblance to each other in terms of the cues they transmit and the mental processing activity they occasion, and that this similarity may translate into an enriched emotional awareness—even emotional (if not cognitive) empathy—which can be lasting (may carry over to non-musical contexts). I took these results as backing for the proposition that habituation to the musical speech of song could heighten sensitivity to non-verbal messages in speech.

Heading clockwise, we come to Vickhoff et al and Benzon. The former's work affirms the latter's harmonising effect of music. It also lends credibility to Benzon's conjecture (based on the work of Lomax) of a circularity to the interaction between a people's music and its culture. It does that by providing scientific evidence of a physiological mechanism via which co-operative musicking might exert a 'co-operatising' force on culture—shape it, not just be shaped by it. I'm well aware, however, that Vickhoff et al's strongest synchronising results were obtained for unison singing. And much as I was cheered by the authors' suggestion of lastingness (that choral singers may develop a “we-perspective”), although synchronisation was once found to have continued after the singing stopped, it was also “brutally interrupted” about a minute later, when subjects commenced another task. There remains, too, the question of how the internal and external (intra- and inter-individual) synchronisation detected might relate to the CP concept I’ve advanced.

From Gibson et al’s association of instrumental music training and mental activity during non-musical tasks, I inferred that music’s impact on brain functioning is integrative and, in some measure, enduring. True, the types of task set participants by these authors have been referred to by others as a limited way of measuring creativity.[26] However, the evidence offered of an intellectually inclusive approach to decision making amongst instrumental musicians is less obviously open to dispute while the authors also hint at instrumental music-making creating a favourable mental environment for the integration of reason and emotion. True also that we can’t extrapolate to Choral Harmony. For starters, Gibson et al didn’t compare musicians who read music with those who play by ear, whereas many of those who might be coaxed into engaging with song as an aid to decision making wouldn’t read music—or wish to learn to do so. Neither does the singer experience the motor impulse to enlistment of both cerebral hemispheres that comes with the instrumental musician’s bimanual dexterity. However, the singer exercises what amounts to ‘concurrent bilinguality’—melds the languages of reason and the emotions: verbal language and vocal music. That could, I believe, confer on the chorister a sufficiently compensatory stimulus. If I’m right, tests of trained choristers could reveal brain processing activity not unlike that of their instrumental music counterparts.

Personal Experience completes the tour. Had I not sung Choral Harmony with community choirs myself, there’d have been no impetus to inquire into song’s neurological underpinnings, and I’d not have had the feeling of recognition for what I discovered when I did.

Taking stock, empathising and musicking share specifics of brain region recruitment that couldn’t be expected by virtue alone of both being complex behaviours that activate extensive neuronal networks, including those related to both memory and emotion. Music’s ability to take people back in time is strongly dependent on its capacity to arouse emotion, and each time it does it consolidates the connection between the memory and the emotion felt, yet it usually does so without provoking that emotion in us . The more readily we’re able to detachedly access emotion, the more willing we’re likely to be to entertain empathising thoughts. There’s some evidence for that in the form of an association between various types of musicking and enhancement of a prerequisite for empathy (namely the ability to interpret the emotional messages in prosody), even promotion of empathy itself, in children and, perhaps, adults. Links between musicking and more expansive brain activity during decision-making style are also not without relevance.

Agreed, that falls well short of substantiation for my claim Group Song has what it takes to bring about a ‘permanent and portable’ cerebral restructuring capable of building empathic ability. Nevertheless, it was sufficient to satisfy me of music’s neurally integrative power and that allowed me to judge my lay case for a Choral Harmony-tool not wildly astray.

With that, my Part Two agenda is complete. Part One identified a need for decision making to become more inclusive. Inclusivity entails working as effectively with feelings as with verifiable facts and figures, and learning to do that will oblige us to devise new techniques. In Choral Harmony, optimal outcomes are dependent on regions of the brain, and individuals, working in parallel; the same can be said for reasoned and empathic (especially group) decision making. This Part, in exploring the intuitive and scientific basis for those statements, has explained my belief Group Song could be repurposed to an inclusive decision-making end.

In Part Three, I'll be aiming to convince you of two things: we should be promoting Choral Harmony to children and adults (in schools and workplaces); and, while obstacles are foreseeable if we do, none are insuperable.

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[1] Abigail Marsh, *Why some people are more altruistic than others,* TEDSummit, June 2016

[2] Toller G, Adhimoolam B., Grunwald T. et al., *Right mesial temporal lobe epilepsy impairs empathy-related brain responses to dynamic fearful faces,* J Neurol (2015) 262: 729.

[3] "Politeness", reflecting "tendencies toward compliance and refraining from aggression and exploitation" was the other element. Hou X, Allen TA, Wei D et al., *Trait compassion is associated with the neural substrate of empathy,* Cogn Affect Behav Neurosci (2017) 17: 1018.

[4] I've heard it said (but don't remember where) that one of the reasons why it brings such joy to sing is that so much of the body is involved in the act: eyes, ears, mouth, throat, lungs, and chest, abdominal and stance-related muscles.

[5] Levitin, op. cit.

[6] Marsh, op. cit.

[7] Robert Sapolsky, *The biology of our best and worst selves*, TED 2017, April 2017.

[8] The Mozart Effect hasn't, to my knowledge, been linked to improved decision making. Nevertheless, given the publicity it's received, I should note that I did look to see what might be the current scientific view of it. As that effect is popularly conceived, having children, even babies, listen to music composed by Mozart will make them grow up to be more intelligent. However, the original research was conducted with a relatively small group of young adult students and claimed only that, for a short time after listening, subjects did better when asked to solve a certain type of spatial puzzle. Subsequent studies have confirmed the limited and temporary nature of any effect but also concluded that similar results can be obtained by listening to other types of music (including "pop" music) and that prior preference could come into it. In fact, it's been suggested that the operative factor is "cognitive arousal" and doing anything that activates your mind should work just as well—star jumps and coffee included! But although the BBC programme from which the foregoing was extracted played down the Mozart effect, it confirmed that music *can* make a difference to IQ—if you're prepared to learn to play a musical instrument. [The programme based that comment on the results of research by Jessica Grahn (a cognitive scientist at Western University in London, Ontario) on the IQ impact of piano lessons.] Claudia Hammond, *It is said that classical music*

could make children more intelligent, but when you look at the scientific evidence, the picture is more mixed, BBC Future, 8 January 2013.

[9] A predisposition towards that view firmed on learning of solid, unmediated connections between the cerebellum—a seat of emotion—and that part of the brain indispensable to reason, the frontal lobes.

[10] Liebman E, Stone P and White CN, *How Music Alters Decision Making—Impact of Music Stimuli on emotional Classification*, 16th International Society for Music Information Retrieval Conference, 2015. Liebman E, Stone P and White CN, *Impact of Music on Decision Making in Quantitative Tasks*, 17th International Society for Music Information Retrieval Conference, 2016.

[11] Hagerer G, *Augmenting Affect from Speech with Generative Music; Emotion Transformation & Prototype Evaluation*, Interdisciplinary Project Report, Technische Universität München, September 2015.

[12] Melody, rhythm and pitch combine as prosody to form a large part of the non-verbal cues to which we respond in speech.

[13] The term for people completely lacking the ability to interpret prosody is ‘receptive aprosodia’. However, it seems there’s some evidence to suggest a degree of this difficulty may also afflict those with schizophrenia, autism spectrum disorder and borderline personality disorder. Hagerer, op. cit. Hagerer cites the following in connection with this work: Ross ED, *Affective prosody and the aprosodias*, 2000; Koelsch S, *Brain correlates of music-evoked emotions*, Nature Reviews Neuro-science, 15(3):170{180, 2014.

[14] If music does have the reach Hagerer cites, perhaps it can affect the composition of the Default Mode Network (DMN)—for instance, the balance, within it of areas involved with reason and empathy. That would be consistent with both better-balanced CP and the possibility of CP occurring regardless of circumstances, i.e. of IP. [The DMN is a network of brain areas ‘involved with aspects of internal thought’; the term captures the pattern of regional activation to which the brain returns when we’re not occupied with a specific task. JoAnna Wendel, *What happens in our brains when we ‘hear’ our own thoughts?*, in Live Science, 1 June 2022.]

[15] Greenberg DM, Rentfrow PJ and Baron-Cohen S, *Can Music Increase Empathy? Interpreting Musical Experience Through The Empathizing-Systemizing (E-S) Theory: Implications for Autism*, Empirical Musicology Review, Vol 10, No. 1-2 (2015.

[16] Winner E, Goldstein T and Vincent-Lancrin S (2013), *Art for Art's Sake?: The Impact of Arts, Education, Educational Research and Innovation*, OECD Publishing. Citations for the research referenced were as follows. Adults: Nilsonne A and Sundberg J (1985), *Differences in ability of musicians and non-musicians to judge emotional state from the fundamental frequency of voice samples*, Music Perception, Vol. 2/4, pp. 507-516. Adults and children: Thompson W F, Schellenberg EG and Husain G (2004), *Decoding speech prosody: do music lessons help?*, Emotion, Vol. 4/1, pp. 46-64.

[17] Rabinowitch T, Cross I and Burnard P (2013), *Long-term musical group interaction has a positive influence on empathy in children*, Psychology of Music, *41*(4), 484-498.

[18] Rabinowitch et al cite: Cheah E, *An orchestra beyond borders*, London, Verso Books, 2009. The group referenced is Daniel Barenboim's West Eastern Divan Orchestra.

[19] Vickhoff B, Malmgren H, Åström R, Nyberg G, Ekström S-R, Engwall M, Snygg J, Nilsson M and Jörnsten R, *Music structure determines heart rate variability of singers*. The Journal Frontiers in Psychology, 4:334, 2013.

[20] Singing is described as a guided form of breathing. Vickhoff et al, op. cit.

[21] Mozart's music has also been claimed to have a calming effect; in fact, on one view, he composed to calm himself. However, at least where this self-directed effect is concerned, it was mentioned as being specific to his compositions—rather than a by-product of active engagement with music.

[22] Vanderbilt News, *Musicians use both sides of their brains more frequently than average people,* Posted 2 October 2008, referring to Crystal Gibson, Bradley S Folley and Sohee Park, *Enhanced divergent thinking and creativity in musicians: A behavioral and near-infrared spectroscopy study*, (The Elsevier Journal) Brain and Cognition, 69 (2009) 162-169. NB: All the musicians tested had 8 years' experience or more, and read music; almost half played two or more instruments.

[23] The authors noted that these results were robust account taken of traits such as verbal fluency, IQ, handedness and schizotypy (position on a theorized continuum ranging from normal dissociative, imaginative states to the more extreme states related to psychosis and, in particular, schizophrenia—Wikipedia, Schizotypy).

[24] Inter-hemispheric coordination is necessitated by contra-laterality—the fact that, generally-speaking, the right/left cerebral hemisphere controls and processes stimuli received by the left/right side of the body (at least for right-handers in the population—some left-handers have a different neural organization, one that isn't simply a mirror image). In consequence, concurrent stimulation of both hemispheres would result from simultaneous use of both hands.

[25] Daniel J Levitin, op. cit., p220-1, citing: Hutchinson S, Lee LH, Gaab N and Schlaug G (2003), *Cerebellar volume of musicians,* Cerebral Cortex 13:943–949; and Gaser C and Schlaug G (2003), *Grey matter differences between musicians and non-musicians*, Annals of the New York Academy of Sciences 999:514–517.

[26] Gibson et al used "The Remote Associates Test" and a "Divergent Thinking Test" developed by two of the authors, Folley and Park. The reference noted was made by Winner et al in the context of similar "domain-general" tests, "such as the Torrance Tests of Creativity (in which students must for example come up with original uses for common objects, or title pictures in unusual ways)." Winner et al, op. cit. Nevertheless, Gibson et al's employment of 'divergent thinking' is consistent with a view of it as an essential capacity for, but not a synonym of, creativity.

Part Three:

From Proposal to Proof and Implementation

5

The Practicality of a Song-Tool

In preceding chapters, I've argued that Choral Harmony's integrative attributes could be harnessed to edge us a little closer to global sustainability—presented it as a means of paving the way towards, and preparing us for a style of discourse which emphasises harmony in diversity and welcomes the guidance of feelings at the decision-making table. Having taken on board the gamut of subjective and objective viewpoints that come with social and economic heterogeneity, we'd face greater indeterminacy; in recompense, we could also expect wiser sequels.

In this chapter, I'll confront the issue of passing from theory to practice. The mechanism I have in mind acknowledges the part played by workplace and school communities in moulding our views on inclusion. I foresee pitfalls en route to 'practice'—in the form of Workplace and School Choirs—but a prior challenge is the small matter of proof. Preparedness by these communities to embark on a song-journey would rest on scientific confirmation of CP/IP and their empathy dividend—unassailable evidence of the utility of a Group Song-based IP-tool

Proof would be the first topic to review then, were it not for an interdependence between proof and practice which militates against their separation. I'll commence by teasing out that interdependence. Then, over two sections, I'll dig deeper into Group Song's appeal, discuss two matters: its relation to specialisation via the latter's bearing on the will to sing in public; and ACCH's ranking on that account, relative to other forms of music. Next will come Choral Harmony in a workplace context: the impediments we'd have to contend with in establishing Workplace Choirs and my reasons for believing they can be removed. School Choirs (the complements of Workplace Choirs) will follow. In closing, emphasis will revert to the individual.

5.1 The proof-practice interdependence impasse

Consider that, before we could look forward to the probable operation of a Song-tool, these things should have occurred. Researchers would have to have been able to prove my theory and that, though they'd not be tilling virgin ground, could be quite resource intensive. Testing for the hypothesised state of mind (IP), circumstances leading to it and benefits derivable could conceivably call for a concerted effort by practitioners in a variety of disciplines. Getting such a project up and running would also require the right experimental opportunity: one or more accessible, real-world groups in each category which were amenable to being studied before and after the introduction of Choral Harmony.

None of that is likely to be forthcoming unless someone, somewhere—probably a multi-disciplinarian, perhaps a neuroscientist and/or decision theorist with an interest in music—sees enough merit in the Song-as-tool concept to make the first move. Assume a study has been conducted and data has confirmed my thesis. The next step would be to demonstrate that too usage is efficient—simple, convenient and inexpensive. For that, we'd be reliant on others to devise an implementation package with which music professionals felt they might be able to found a new service. Organisations would still have to be convinced of the wisdom of taking up the service—investing in the formation of choirs—and that would take time. If there were no other spanners in sight, scientific backing and availability of a delivery model might be adequate to win their management over.

Might; that wouldn't be a safe bet if you couldn't be sure choirs would appeal. Which is to say that the concept could be sound from a neurological and resource standpoint yet be ineffective and/or inefficient—unworkable—if it's implementation was felt as an imposition. Western participation in communal song has trended down over much of something like the last hundred years. Add that the research by Greenberg et al points to cognitive mode—whether it's more 'empathising' or 'systemising'—having explanatory power when it comes to individual differences in musical preference, and I could be preaching to the converted: those most eager to take part in a trial would likely be people who inclined toward the very cognitive style it's theorised Choral Harmony would cultivate.[1] If that were judged likely to limit buy-in, a pilot programme might not get past square one—research funding.

You could frame that proof-practice interdependence like this: while all stages up to and including implementation would benefit from a revival of interest in communal song, the catalyst of successful implementation would go a long way towards bringing about a resurgence. There is an out from this impasse: it relies on the thought of advancing a cross-generational, collaborative, sustainability-related scientific effort acting as incentive to participation by business and educational communities.

School and Workplace Choirs have the makings of excellent 'testees' for a research group. We could get by with two schools and a corresponding number of suitable sponsor-organisations eager to co-operate with researchers. [One school-organisation pair would act as a control. For the other—experimental—pairing, suitability would be a matter of commitment to (temporarily) changing decision-making processes and resourcing the trial choirs] Researchers would be comparing and contrasting, within and between groups, the effect of participation in Choral Harmony on mental processing (relative use of LP, PP and CP, and signs of IP developing) and how that might affect problem solving and decision making. [Even better, they'd be on the alert for signs of outcome differentials amongst those who think, cognise, perceive the world in ways foreign to inhabitants of the mental mainstream. Making a conscious effort to study the minority could open desperately needed new windows on decision making. For example, among those diagnosed as 'autistic' are visual thinkers; it would be instructive to understand their composition and frequency of CP, as well as their relative aptness to develop IP. Many of what we classify as mental 'disorders' aren't lived as such and it's only our limited ability to see things from the perspective of a different mental 'order' that prevents us from valuing alternative views.]

The return to collaboration between researchers, schools and partner organisations would be broadly-spread. If I start by considering the children, participation could, by breaking down some of the psychological barriers to active engagement with song, sustain receptivity to novel experiences, to change. The average child is willing to give things a go and non-judgemental: their default position will usually be respect for the input of others. When that disposition begins to alter, the cause can ordinarily be traced to adults. We teach them they must be highly skilled or talented to make a worthwhile musical contribution. The project I have in mind would do the exact opposite, anchoring co-creativity and co-operation.[2] [And that whether or not an empathy impact was detected!] The project would also supplement often stretched school budgets in resourcing adequate music programmes.

Researchers might have to invent experimental techniques suited to the young. However, those would be bound to find applicability elsewhere and the children, with their malleable outlooks and brains still being wired, should be a responsive study group. Working with children of all ages (as well as adults) might also provide unpredictable learning opportunities; they can be very insightful. Organisations would be securing an opportunity to, perhaps, improve their ability to manage under conditions of uncertainty. The project's broader agenda might also give them satisfaction.

In brief, I envisage empathy-directed Choral Harmony research in schools and workplaces being a deeply gratifying and rewarding experience for all parties. That could be enough to break the proof-practice deadlock. The only thing is, for a contagion of Choral Harmony to eventuate from a successful trial, we'd have to break through the average Westerner's disinclination to sing. Next up then, how we might account for the latter.

5.2 Specialisation and the will to sing out

There are some wonderful African song-maxims. One with special relevance comes from Zimbabwe and the Sudan:

> "If you can walk you can dance, and if you can talk you can sing."

The gist of another is that song creates community, and membership of a community is what makes us human. To the extent that these proverbs live in Africa, African society perpetuates the tradition of communal song, confirming the value of its universality and humanising qualities. Participation then becomes a joy, a right, a need, an obligation.

Whether such a view of song (as integral to our humanity) ever held sway in Western society, I couldn't say. But there were times when work, play, the major events of life and many of the minor, were occasions for song. Now there'd be few instances in the West of a wide-spread, strongly-maintained, communal-song tradition.

For an explanation, let me retrace my steps to Chapter 2 and the evolution of music and language. An implication of that discourse is that, for all but the most recent, short span of human history, vocal music would have been part and parcel of daily life for all. Talent wouldn't have entered into it. Somewhere along the line, that began to change, and much of the change seems likely to have been wrought by complexity-driven specialisation. It's been suggested a general trend towards specialisation was a response to growth in the size of the basic human unit (tribe, clan, etc.), thence the complexity of social structures. Specialists were expected to exhibit talent and/or achieve higher standards, and this may have raised thresholds for all. A second explanation for the demise of communal song refers to the rise of less egalitarian, more exclusive, local socio-political structures. There's a theory which links that rise causally to divergence of musical traditions, a switch within cultures from a group musical tradition to an emphasis on the soloist. Bar-raising plus individuation would have deterred—and in some societies may have precluded—many from singing.[3]

In the melting pot that is the industrialised West, those divergent musical streams have re-converged: soloist and group modalities, vocal and instrumental, are equally well-represented, with any differences across society being owed more to income and opportunity than other socio-political considerations. Even so, Westerners are musically divided: a minority produces music for the majority to consume.

Ready access to performances by that professional minority creates yardsticks (standards as criteria for the acceptability of musical expression). Giving us more to live up to raises the spectre of 'failure'—of finding ourselves wanting as singers—which can make us more than ever reluctant to transition from passive to active participation, consumption to production of music. That is, we judge ourselves by unrealistic standards then, when forced to admit we've fallen short, give up the attempt to make music altogether—refrain from musical creativity because we attach so much importance to being 'good'. It's important to set high standards but it's the quality of the 'process' (musical experience)—rather than that of the 'product' (musical sound)—we're talking about here. Most people would agree that, as a general principle, we should do our utmost, enter fully into the spirit of things and accept what comes of it. But music is a case of easier said than done—and song is entirely another story; we really don't seem to be able to accept ourselves as singers. It's not obvious to me why that should be so.

One reason might be that holding an instrument gives us something to concentrate on—and hide behind—but it would be more complicated than that. Another could be that singing requires us to 'speak up': the use of our own voice (self-expression rather than instrumental expression) might cause us to take criticism more personally, be more anxious about judgement. A third may be that we underestimate what training can do. Though vocal (as instrumental) capability reflects the usual mélange of nature and nurture (there is a regulatory loop here too: participation accentuates feelings of worth and gives confidence, a mainstay of growth and progress), we seem to feel that innate ability is a must for the singer.

At any rate, vocal musicianship, more so than other forms, seems to have become an indicator of personal value. If will to sing is so fragile, the measure of safety in Group Song's numbers may not be enough for everyone to lose their sense of susceptibility. But whatever the immediate cause of the latter, I'm sure the professional/non-professional and creative/receptive musical divisions within our society to which it can be traced would seem strange indeed to those indigenous peoples who maintain song traditions unscathed by specialisation.

Communal, communing, community, communication. That's what song is, and always has been, about: expressive, relationship-building communication. In entertaining the role I espouse for song we'd merely be returning to its roots. All the same, it will be important to choose the right song form if we're to attract people to song, and the right form is a matter of appeal and accessibility. When I pronounced Group Song an accessible activity I noted we'd return to ACCH's appeal, and that time has come.

5.3 The appeal of Choral Harmony

Music has universal appeal: virtually everyone enjoys some form of it. But as you move deeper into its sub-, sub-sub, etc. categories, appeal could be said to diminish in that ever fewer people will be engaged with the form. Figure 11 illustrates.

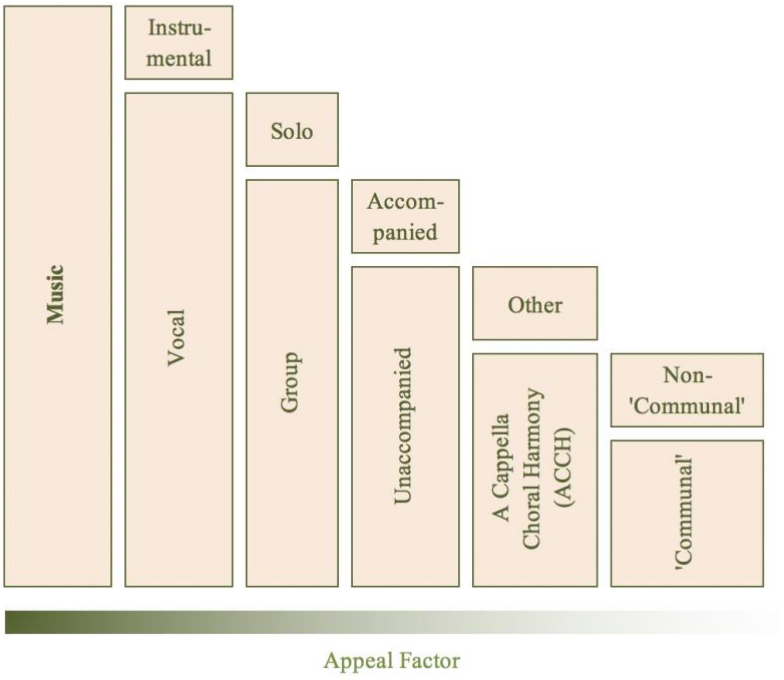

Figure 11—Appeal of Music Types

That ACCH should be pictured as possessing relatively little appeal is as you'd expect for a highly differentiated form: it isn't to everyone's taste, even in many countries where it's a long-established tradition. Moreover, cultural norms may prevent the exposure that could change tastes. [Societies differ in the extent to which: men/women may/do sing; those who sing do so as soloists/in groups; singing takes place in private/public; and/or men and women are permitted to sing together.]

In nevertheless making ACCH the core of my song-argument, I run the risk that, at best, I alienate those who've had no exposure to it and, at worst, the whole concept of a song-tool is reckoned too-aligned with Western culture to be of universal relevance. However, I accept those risks, for reasons which I'll now explain.

We'll start with the worst-case scenario. Cultural constraints on my proposed tool's utility aren't what they might once have been; innovations such as the World Wide Web have hastened the spread of ideas, shrinking cultural differentials. That not only improves the chances ACCH can cross cultural boundaries, it creates new opportunities for reverse influence, to absorb, adapt and return to sender, embellished, expanded, refined. I'm confident we'll know it soon enough if my recommendation can be topped—if another form of music should prove more adept at stimulating IP, or equally adept and have greater appeal. Certainly, I'm not lauding any form of Choral Harmony as a superior cultural form, only trying to start the ball rolling, set in motion an investigation which, if the effort seemed warranted, might go on to establish the relative fitness for purpose of various musical forms.

As for exposure to ACCH being a sine qua non for Song as an IP-tool to be taken seriously, I'd make three points. 'A Cappella Choral Harmony' is itself a blanket term encompassing everything from Gregorian Chant to Barbershop Quartet. I know that if I thought there was merit in it, I'd consent to sing most any style of song, while any number of musical genres (classical, gospel, blues, jazz, rock and more) can, and have been, bent to the form. And objections to singing unaccompanied often melt with experience—good, of the richness and beauty of blended voices; bad, of singing to music which overpowers or doesn't feel quite right.

But if I'm quietly confident appeal wouldn't be a major obstacle to take-up or implementation of an ACCH-tool, I do recognise that significant challenges to Workplace and School Choirs would remain. In the sections which follow, challenges and the advantages of meeting them will be interwoven.

5.4 Workplace Choirs

As remarked, for real change to occur we have to feel (as well as know) that it must. Emotion—EQ, especially the ability to empathise—is also the crux of the requisite change itself. If we're ever to see the intent of terms such as 'sustainability' widely realised, we must learn to consult the whole of our brains and commune across the range of brain types. Nowhere in this complex and uncertain world does that hold more than in the corporate sphere, where risk-taking and rapid action are so valued.

Making full use of everything our brains—all brains—can offer, is what a CP-habit (IP) is all about. CP may be routine when undertaking tasks already mastered, but most wouldn't be conducive to CP that's transferrable to—language-based—workplace settings. CP engendered by participation in ACCH would be, and without the need to 'master' singing in the way that a musician needs to master their instrument; the singer comes pre-equipped to the activity. Accustomed to working concurrently with language and music the chorister's brain, so my theory goes, would be more receptive to the intelligence of the emotions as guide to choice. Predisposed to deal even-handedly with EQ- and IQ-sourced information it should be less biased towards reason—house a gatekeeper more willing to lift some of the constraints we've unknowingly conditioned it to place on the contents of consciousness. Moreover, in a Workforce Choir which cuts across all organisational boundaries—of qualification and status as well as age, sex and gender-identity, ethnicity, etc.—choristers would experience practical, enjoyable, organisation-wide collaboration unimpeded by the rules and routines that would usually govern their work-day.

Workplace Choirs are 'meetings' in which traditional concepts of leadership fall away and contribution to harmony is the measure of each individual's success. This makes these gatherings a non-threatening milieu in which to practice co-operative endeavour unhindered by territorial or hierarchical constraints, and with a stimulus to empathy denied by our obsession with electronic connectivity/communication-at-a distance. The exposure and experience they provide should result in greater ability to appreciate a wider range of colleagues (their roles, aptitudes and characteristics) hence, for example, greater willingness to make room for cross-fertilisation between individuals or groups with different responsibilities, and diversification of the workforce. I can put it this way. Workplace Choirs share with decision-making groups reliance on active, willingly co-operative participation by persons possessing a limited skill set/range of capacities determined by nature and nurture. Assembling as either choristers or problem solvers, colleagues would be learning to see beyond previous perceptions of individual limitation and utilise the potency of diversity.

Misjudgement of the value in diversity is a key source of prejudice in the workplace and discrimination is inconsistent with sustainability: there are losses all round. People suffer financially, psychologically and physically; organisations can’t reap the rewards of all available knowledge and experience; and government budgets come under increasing pressure from higher rates of unemployment and ill-health. Take for instance discrimination on the basis of age.

In theory, younger Human Resource professionals would know that ageism, like most ‘isms’, is unethical and runs counter to sound business practice. They have access to research such as that by Daniel Levitin, who tells us “multigenerational teams with older members tend to be more productive” and that Deutsche Bank “report(s) fewer mistakes as well as increased positive feedback between young and old” from such teams.[4] In practise, however, their youth may be a limitation, keep them from having any real feel for what maturity and experience can bring to an organisation. Increased familiarity with their older colleagues, coupled with growth in empathic ability, could alter their perspective—perhaps enough to seal Jenny Brice’s “glass trap-door”. Falling through one is how she describes what happens to 50-year-olds, who are then left with no alternative to claiming unemployment benefits. She points to the blatant contradiction between corporate attitudes which needlessly shorten working life and government efforts to extend the retirement age. The trap-door, she further notes, is anachronistic given the length of modern lifespans.[5]

As Adam Grant’s research makes plain, much subtler kinds of preconception than ageism can be just as costly, amongst them who we think is performing in their job.[6] Grant studied organisational ‘givers’ and ‘takers’: those who enter into most workplace interactions with what they can do for others in mind, and those who are more concerned with what others can do for them. The givers, he notes, often suffer, falling flat on standard measures of productivity because of time spent helping the team—sharing knowledge, mentoring etc. That, when the frequency of giving behaviour within organisations moves in tandem with organisational performance assessed using measures of profitability, customer satisfaction, employee retention and operating cost. [Grant also describes a third group, to which he found most people belong: the ‘matchers’, characterised by a ‘quid pro quo’ attitude.] Growing levels of appreciation in the workplace should increase the will to state views and countenance (if not seek) those of others on non-trivial matters, easing the changeover to a help-seeking culture. That could further profit sustainability by dampening the individualism which typifies the West—individualism as a culturally-imposed obligation to stand out, not as a healthy sense of self. I hesitate to say it definitely would, because individuation may bedevil choirs themselves.

Though it’s rarely overt, a competitive streak does occasionally surface in community choirs . In an earlier chapter, I recounted an instance of individualistic behaviour that ran counter to the co-operative essence of ACCH. Lamentable as analogous conduct by a Workplace chorister would be we should envisage that it will occur—that the very characteristic which makes it urgent decision making should become more inclusive might stymie our chances of progressing that aim through a co-operation-dependent mechanism.

In as much as hierarchy creates a division between leaders and followers which sanctions competitiveness, a Choral Harmony-based IP tool would have to contend with unwillingness by the odd decision maker to see the melody-line (and/or an occasional solo opportunity) allocated to colleagues who, in the normal course of workplace events, would rank below them in the pecking order.[7] Reluctance would likely only be exacerbated by awareness that an outcome guiding the original constitution of the choir was less concentrated decision-making power. From reluctance to opposition isn’t a giant stride. A few powerful individuals who felt threatened could foil unbiased appraisal of a choir-formation proposition. Rivalry could take other forms. A competitively-inclined person accustomed to exercising executive power might subordinate their voice in song but be unable to resist the temptation to have it heard on matters of choir management or direction. Equally, however, it’s not beyond the realms of possibility that a relatively powerless employee recognised to have a ‘good’ voice might seize the opportunity to shine (indulge in vocal differentiation). However, it doesn’t follow that competitiveness is a negative trait.

Margaret Heffernan makes the distinction between competitiveness and aggressiveness.[8] The thrust of her talk was this: as friendly rivalry, intra-group competition can be productive; as a way of ensuring dominance, it will birth superchickendom and suppress productivity. The term ‘superchicken’, she tells us, was coined by William Muir (an evolutionary biologist) when presenting the results of his productivity-related experiments with … chickens. What those experiments showed is that when under- and super-achievers (in egg-laying terms) were placed in separate groups, and each group left to its own devices, the chickens in the ‘superflock’ pecked each other to death while the other group prospered, increasing egg production. Muir reportedly concluded that “The individually (most) productive chickens had only achieved their success by suppressing the productivity of the rest.” Heffernan goes on to list the attributes of successful groups, as they’ve emerged from further research conducted with humans. Successful groups tested well on indicators of empathy, were more egalitarian and acted in a responsible manner (with all pulling their weight and none hogging the floor).[9]

And by Heffernan’s account many companies are taking on board the superchicken lesson, that to pick winners—invest all resources and vest all power in a few superstars—isn’t the best choice for an organisation to make. Newer strategies recognise the importance of creating opportunities for people to get to know each other and, in general terms, developing a social support system that will hold their people together in taxing times. [Or, as I’ve also heard it phrased, putting effort into developing people rather than finding ‘talented’ people to fit the role.] Social capital development programmes—including strategies which promote that help-seeking culture—are essential when doing breakthrough work she says, likening them to the mortar binding bricks. I prefer a slightly different analogy. Since understanding, trust and respect gain so much from clear communication, I see Heffernan's system as comprising communications channels along which diverse minds can travel to meet and exchange ideas, knowledge and perspectives in a compound solution-space. In that space, the biases of one—and we all have them—can be offset by those of others, allowing for more complete problem identification and, potentially, more innovative solutions.

To return to superchickens, their behaviour is patently antithetical to the intra-group social cohesion which contributes so much to the success of group endeavour (chicken or human). Luckily, extreme ego-centrism is confined to the minority. Most groups would be 'normally distributed': within each organisation you'd expect to find a few (at the tail-ends of a Gaussian, or Bell curve) extremely willing/unwilling to increase the rewards to co-operation relative to competition, but the many are more likely to be neither (that is, located under the curve's dome); to be indifferent, therefore open to persuasion.

We've not yet spoken of leadership. A leader may be ready to share responsibility for choral outcomes without that readiness carrying over to other areas of workplace interaction. The issue is leadership style. 'Leadership' is variously construed but portraits of a leader tend to have in common the will to make one's presence felt, one's voice heard when it's deemed to count, as it does in the workplace. Empathy and active listening are about the opposite: stilling the voice, temporarily laying aside one's own views and giving the word to others. But an ability to straddle that divide may not be sufficient to create the preconditions for inclusivity in management: a workplace leader's commitment to shared responsibility is no surety others will have the confidence to jump in and speak up. Gentle prodding may be required, even 'coaching' or 'elicitation': co-operative leadership. Co-operative leadership takes confidence, competence and … courage—to reveal the limits of one's own skills and abilities, to unashamedly seek alternative opinions and advice. As such, it's closely allied with 'leadership from behind', which amounts to encouragement of leadership in others, to flat and inclusive decision-making structures.

Now a proposal to consider investment in Workplace choirs is likely to be relatively well received where management is behind transition to such a structure. There, assessment and implementation have a good chance of being treated with the same respect and diligence accorded any other investment made in human capital. But what of workplaces where the climate is already co-operative; what use would they have for a choir? And what of those where an unabashedly competitive spirit rules; would they seriously contemplate a choir? To the first of those questions, I'd respond that the most confirmed 'co-operators' can't will themselves into the more integrated mental state encapsulated by CP/IP; they'd be as much in need of a 'tool' for the purpose as anyone else. It's for that reason the concept isn't tied to a particular governance structure; it's relevant to all decision-making systems—the rigidly hierarchical as much as the loose and/or consensual.

My answer to the second question is longer and requires some backtracking. You'll recall I've referenced Bryan and Heffernan as management thinkers who've urged corporations toward more collaborative work patterns. Advice of the sort, if heeded, would be preparatory; it could nudge an organisation's ethos towards acceptance of a place for concepts such as that of Workplace Choirs—agreement to trial them. I've also noted, as an article of faith of the 'Arts and Sustainability movement', that feeling is what tips the balance, decides us to act. And I've said that Paul Bloom's fascinating pleasure-learning principle appeared to bear some relation to the postulate advanced of a virtuous mimicry spiral. The latter point initiated a mental colligation of the other two.

Bloom said that "… if you want to enhance the pleasures of your everyday life, one way to do so is through knowledge." He went on to cite an example from music—youngsters and classical music. To them (and to some adults) most of it would sound terrible but with listening comes understanding and experiential enrichment.[10] That which manifests with increased understanding, he tells us, constitutes a "real, visceral, phenomenological change" deriving from a biological adaptation he calls "essentialism" which "drives us to focus on the deeper aspect of things". In Workplace Choirs, people would be gaining that deeper understanding of their companions in song, with full knowledge of its relation to desirable EQ skills. They would be aware, that is, of the benefit their willingness to participate conferred (on themselves, their colleagues and the organisation). Furthermore, if, as Bloom suggests, pleasure is greater when shared, the fellowship of Workplace Choirs could extend their capacity to give pleasure.[11]

Continuing to explore the interaction of utility and pleasure, enjoyment of an activity usually promotes a relaxed attitude and open, creative mind—a pleasurable, playful state of being. For Steven Johnson, necessity isn't the mother of invention, play is.[12] The psychological literature uses other terms than play—such as taking a less-focused approach or attacking indirectly. Whatever the terminology, the intention is always the same: relax, have fun if you want to ease solution of complex problems. But for that possibility to be realisable through ACCH we'd need to get past the mindset which sees play as frivolous when working towards a 'serious' end—win participants over to the view that play is about taking ourselves less seriously, not what we do. If that view can prevail and song, accepted as useful, is entered into playfully, it's more likely to be experienced as pleasurable. Then pleasure's own utility dimension should cut in, enjoyment incentivising participation and learning. The stress reduction associated with playfulness would be a bonus—for organisations as for choristers, since stressed-out decision makers can't make wise decisions.

All in all, there's an embryonic pleasure-knowledge spiral in ACCH that could create goodwill towards it as an IP-tool and the tool's intended use, lowering some of the psychological barriers to change, including change in decision making itself. The big stumbling block to maturation of the concept would be commitment by Workplace Choir host organisations to the creation of infrastructure tailored to acquisition of a portable attribute; in today's highly mobile job market, portability eliminates any guarantee of return accruing to the host's investment. But while that could tell on the early stages of tool uptake (could: training can also inspires job-loyalty), savvy managers would realise that what goes around comes around. Moreover, IP's portability is a function of its permanence, so expenditure on its acquisition would be 'front-loaded'.

However, what I'd really be relying on to make the necessary resources available is acceptance that adults are guardians of the future, children its chief asset—

acceptance, therefore of the need for concurrent action on two fronts: to alter ourselves as appropriate, and to arm children with the skills that will enable them to become responsible, empathic adults. Workplace Choirs allow of that. For starters, a large part of an ACCH-tool's distinction would consist in this, that with IP we could cross barriers of time and space—make contemporaries of different age-groups within and between societies, enabling them to better inhabit the same mental space. The associated inter-generational demonstration effect could be significant. Gathered in Workplace Choirs, adults would be leading by example, modelling advocated behaviour and, in the process, providing a cogent, practical form of backing for School Choirs. Workplace Choirs would also be continuity for school choristers, a familiar institution as they enter the world of work and reassurance that the ability in which we'd trained them was valued. In sum, Workplace and School Choirs would be complements: the primary IP vehicle for, respectively, todays' and tomorrows' decision makers.

If the prospect of getting Workplace Choirs up and running yet seems to you implausible, think of the communication and connectivity lengths to which firms have gone. Some have banned coffee mugs on desks in favour of synchronised coffee breaks, others have established company veggie gardens and a good few have found it worth sending their employees on adventurous, team-building exercises. I believe there are organisations that have employed story-tellers and a few that have run with laughter classes. On the one hand, all such measures would have met the mixed reception I anticipate would greet the introduction of weekly choral sessions in places of employment. On the other, we know that CEOs value (and, in many instances, enjoy) opportunities for team-work. We also know that companies like McKinsey are counselling corporates to better integrate their human resources for the purposes of learning to think differently. And many CEOs would be aware of a resurgent interest in choirs—as evidenced by the 'Pub Choirs' movement and the popularity of TV shows featuring choirs. [Examples include the American College Choirs and, a few years ago, the Choir of Hard Knocks.] They'd be primed to view a Workplace Choir as apposite—and not be surprised to learn that coffee breaks had become song breaks. ['Workplace Choirs' might have a formal ring to it, but once they were established you might find song popping up here and there throughout the day; it could come to be more of a 'Brain Break' (we'll come back to them).[13]]

It may sound as if I'm confident Workplace Choirs would achieve the breadth and depth of acceptance presupposed by eligibility for duty as song-tool test-beds. That might be stretching it, but I am optimistic.[14] As with time spent on 'slow decision making' or resources allocated to development of fossil fuel alternatives, it is, as I've already intimated, a question of distinguishing between consumption and investment. Through IP these choirs would be making available portions of the information spectrum now rarely accessed to improve LP/HP co-determination of outcomes—and doing so within an inclusive, co-operative framework.

5.5 School Choirs

We mustn't wait until people have entered the workforce to begin this form of investment in human capital. If we want to properly equip the next generation for well-balanced decision making, we should be starting during the earliest, most formative stage of cerebral ontogenesis practicable. I'll say it again: 'well-balanced' denotes reason and empathy seamlessly integrated—rational, linear thinking skills extended by machine intelligence and the more empathic, expansive capacities that the arts, especially music, nourish. Both elements in that balance are products of nature and nurture—both innate and shaped by environment, especially during the early years.

Interests and aptitudes vary by age group, so when acquainting children with Choral Harmony we couldn't rely on adult motivators. Bloom's finding that understanding leads to pleasure allowed me to attach some weight to the possibility knowledge-based pleasure would enable us to lead adults straight into ACCH. For children, I'd be counting on the reverse, pleasure leading to understanding. In consequence, I'd propose we initially prioritise ease and enjoyment for them. Gradually, more opportunities could be created to teach them about the benefits of song: to add the pleasure derived from learning. Eventually, once the beginnings of the pleasure-knowledge spiral had begun to manifest, the children could be shepherded through Choral Harmony to ACCH (and song-developed IP).

In the back of my mind, when I came up with that gradualist plan, was the experience, a few years earlier, of a young person of my acquaintance. She'd been tested by her school for musical ability and offered free tuition once a week. Subsequently, when asked what instrument she'd like to learn, she'd nominated the guitar. Unluckily, preparatory trials had exposed her as one of only two amongst the girls tested who was capable of extracting a note from the trumpet; so that, her teachers promptly decided, would be her instrument. It was the trumpet or nothing; she chose nothing. My reaction to this story was sincere regret that an opportunity had been lost—for her to gain highly beneficial experience, as well as gain confidence and begin to acquire a skill that can bring lifelong enjoyment (all factors which make for better decisions). I puzzled over the school's decision. No person I knew was privy to its ins and outs but several lines of thought were tendered. The music teacher: had a penchant for the trumpet and wanted a change from most children's favourite (the guitar); wished to break with the convention of a male trumpeter; and was arranging instrumentation with the planned end-of-year concert in mind.

At some stage, it crossed my mind that most children will opt for fashionable instruments, those to which popular culture (often reinforced by the choices of family and friends) has exposed them. Teachers have the invidious assignment of essaying to meet each child's desire without pandering to fashion or prejudicing other objectives. This opened up a fourth possibility: that insistence on trumpet was a counter strategy, designed to draw attention to an instrument less well-known by the children. Say that was so, and another trumpeter was recruited. Still the strategy couldn't be ruled successful. A primary objective of music programmes in schools is active student participation. A child had dropped out before day one and it wouldn't surprise me to learn that others followed suit: obliged to take up their second or third choice instruments, they may have been unenthusiastic about music lessons and had less incentive to persist until the steep learning curve had flattened out.

There must be some path around this which could be accommodated within the student-teacher ratios extant in mainstream schools. [Schools other than, for example, Steiner and Montessori whose educational systems are premised on music as a key to development and which allocate resources accordingly.] Could we perhaps have children listen to music before they chose instruments? The initial phase might acquaint them with uncomplicated arrangements while highlighting the properties of instruments showcased, and explaining their origins and how they're played. This would provide for a demonstration of instrumental voices complementing each other to produce the complex results heard in multi-instrument arrangements. With their horizons thus widened, children might be content to be allocated instruments they'd not otherwise have gone for—even compete to be chosen to play them. And the larger lesson would have been incorporated: the importance of real listening and collaboration.

That suggestion would seem to muddy the waters of the 'pleasure to knowledge' stream for children, except that the response I've predicted is likely to be more emotional than intellectual, a reaction to the sounds/music or to the dare (overt or covert) to stretch themselves, rather than to 'information' received. Learning would be incidental (a spinoff from the increased receptivity which came with participation), or at least it would be for those children privileged to enjoy instrumental music tuition. Many aren't: either their schools don't have the financial backing to offer a programme or an instrument is unaffordable for their families. A few amazing communities have managed to bring music to disadvantaged children. In one I read of, skilled volunteers and instruments improvised from recycled materials have filled the gap—with stunning fruit, social and musical. Short of such initiatives, Group Song may be the sole feasible avenue to participatory music for many children. This accessibility is the most salient of Group Song's advantages. All it asks (other than someone to teach, lead, cheer and give confidence) is children's voices—their voices and the readiness to raise them in song.

Children can be hypersensitive to criticism and confidence lost at a tender age can be exceedingly difficult to restore in later life. From that ensues the worth in helping children discover their voice and understand that all voices have their place. One thing we could do to obviate their concerns might be to demonstrate what happens as ordinary voices blend, especially if the singers were adults known to them, teachers and/or parents prepared to put egos on the line—lead by example in modelling coordination and collaboration, and do so in a spirit of play. The demonstration might move from pairs to larger groupings, then part formation and, finally, full harmony. The children would hear for themselves how the overall sound grew in richness and complexity at each stage, and, I venture, be just that little bit more game to give it a shot themselves.

What I've described is just one possible technique amongst many which we might imagine. In her TED Talk, *Creative ways to get kids to thrive in school,* Olympia Della Flora tells how she incorporates 'Brain Breaks' into her classes' school day.[15] Singing songs is something the students are permitted to do during these breaks; they may also do yoga poses and participate in other structured (but physical) activities. And the only cost to such breaks is a little 'time out'—which, if Della Flora's experience is anything to go by, results in more effective 'time in'.

I couldn't wish for more from either School or Workplace Choirs. A School Choir movement will have been effective if, in engaging children with Group Song, it reveals to them the value of diversity and extent to which communal success is reliant on individual listening skills. Close listening is an essential complement of voice production in Choral Harmony, adding greatly to the form's IP-inducing capacity.

Yet what it brings is often overlooked: we'll have to teach listening skills if we want tomorrow's leaders to apply them.

5.6 Back to the individual

I began this document with a reference to individual responsibility—for the current state of our world and to ensure a better future for all. Reconciling that with promotion of a group endeavour requires acceptance that decision making which eschews diversity is unlikely to be wise. Yet learning to work effectively with diversity, to be able to hold your ground without forfeiting your place in a nested series of larger wholes, isn't a skill that comes easily to many of us. The fact the chorister is tasked with doing just that goes a fair way towards explaining why Choral Harmony has been central to my case for promoting empathy in decision making. Now, in closing, I want to renew emphasis on the individual.

Assume with me, for the moment, that research into the concept put forward produced such resoundingly positive proof that schools and organisations everywhere rushed to establish choirs; a single unwilling participant is all it would take to undermine the chances of IP emerging in others, therefore of group success. Belief in what the choir might achieve isn't obligatory (ACCH can be transformative without choristers being invested in a particular outcome); the will to fully participate in the experiment (attempt to work 'as one' and be prepared to change) is.

Somehow, people must be persuaded to abandon ego if we're to live lives better attuned to the interconnectedness of our world. In an ACCH-setting, a dilemma analogous to the proof-practice stalemate could arise. It's this: there's a greater likelihood of people acting collaboratively if they've experienced the boon of bona fide collaboration, but many haven't. That said, it's not all bad; conceding this reality could aid in designing an IP-tool which honours the positive correlatives of contrasting personalities. Take for example the Chapter 2 choristers who disdained to blend their voices, and assume they were motivated by a competitive spirit. It would be prudent to admit that competition, too, pushes out frontiers. However, the aim is to cultivate leaders able to function as well in competitive as co-operative spaces. It's all a question of harmonious proportionality, a balance between personality facets which needs to be established early on—before there's any prospect of ego development derailing the will to acquire it.

There are societies where competitive co-operation is the guiding spirit of culture—where the problem of what might be termed 'excessive individualism' is unthinkable. Amongst them, we're told by Maybury-Lewis, is that of the Xavante Indians of central Brazil.[16] The Xavante practice ceremonial "log-racing". Originally taken to be trials of strength, these races are now known to be "an aesthetic event": the tribespeople will tell you "the most beautiful log race" is that which comes closest to ending in a dead heat between the two teams.

It wasn't lost on me in reading of life amongst these people that communal song has great signification for them as "tangible evidence of the harmony for which they strive." In log-racing, that emphasis on harmony is communicated by doing whatever it takes to make both teams look equally good; individuals are constantly swapping from one to another so as to ensure the weaker team (or the one with the heaviest log) is able to keep up. That doesn't mean there's no competition at the level of the individual, only that the aim of efforts to outdo each other is approval as the person who contributed most to group achievement of a societal end.

The Xavante are born to co-operation. It's embedded in their culture, part of their identity. They learn to adapt—not subordinate—their competitive spirit. The poser for us is reversed: learning to promote co-operation in a society dominated by competition. Forget log-racing; we don't need it to take a leaf from the Xavante's book—their Song-book, that is. What I've striven to reason through, the Xavante—and many other 'tribal' societies—have long understood intuitively: that communal song is a force for interpersonal integration.[17]

Interpersonal integration, and much more. In speaking of the Australian Aborigines, the same Maybury-Lewis brings to our notice similarities between their philosophy and characteristics that science has encountered in the quantum world. He's of the view that:

> "The songs and Songlines are so important because they are the musical embodiment of the properties of reality. They are at once the equations that describe it and the forces that make it work. … They are, in effect, the cosmic rhythms and melodies that give the everyday world its form."[18]

String Field Theory isn't mentioned but Dr Michio Kaku likens the ultimate constituents of all matter—the particles which stream from smashed protons—to musical notes on a tiny vibrating string. [19]

> "Physics is nothing but the laws of harmony of these vibrating strings. Chemistry is the melodies that you can play on these vibrating strings. The universe is a symphony of strings. And the mind of God is cosmic music resonating through hyper-space."

If a form of nurture—a product of culture—can so directly reflect the laws of nature, then its perhaps not too far-fetched to imagine song-strings criss-crossing the globe. Then, by relearning to sing their songs—in perfect harmony—we'd be entitled to claim we were playing our part in the universal symphony: singing-up a sustainable world.

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[1] Empathising refers to "the cognitive and affective capacity to understand and react appropriately to the feelings and mental states of others". Systemising is "the capacity to construct, analyze, and predict systems, including those that are natural (e.g. weather or tidal systems), abstract (e.g. mathematics), organizational (e.g. classifications), and technical (e.g. the construction of a musical instrument or mechanical motor)." Greenberg et al, op. cit, referencing various works co-authored by Baron-Cohen.

[2] The formative nature of the Choral Harmony experience would be as pronounced for adolescents as 'children'. Dr Victoria Williamson refers to adolescence as a period in life which produces dense and numerous memories. Given the powerful links she says are formed between memories and music, I speculate that pleasant memories of collaborative music might make an enduring impression favourable to co-operation in later life. ABC Radio National, *You've got the music in you*, All in The Mind with Sana Qadar, 5 June 2022.

[3] Benzon, citing Lomax, refers to the impact of complexity (William L Benzon, op. cit.). Unfortunately, however, I neglected to record the main source of these points.

[4] Daniel Levitin, *What is the ideal age to retire? Never, according to a neuroscientist*, TED Ideas, Science, 27 February 2020.

[5] Jenny Brice, interviewed by Ellen Fanning, *50 something women and ageism in the workplace*, Life Matters, ABC Radio National, 6 January 2017.

[6] Adam Grant, *Are you a giver or a taker?* TED@IBM, November 2016.

[7] I can't resist adding a reminder that the melody of many songs (probably the greatest portion of those written for Choral Harmony) is written for the soprano vocal range, which isn't commonly found in the upper echelons of corporate and political decision-making circles.

[8] Margaret Heffernan, *Why it's time to forget the pecking order at work*, TEDWomen 2015, May 2015.

[9] Successful groups also had more women in them. It's unclear whether women were a majority in those groups or simply a greater proportion than in the less-successful groups but, either way, the researchers felt that having more women made a difference, probably by doubling-up on the empathy factor and/or increasing group diversity.

[10] Bloom, op. cit. The pleasure Bloom describes is something quite other than that which may be derived from, say, the emotions music arouses and/or permits us to express.

[11] I assume Bloom's work is based on similar research findings to those which gave rise to a comment by Harvey, along the lines that we're hardwired to find enjoyment in co-operation.

[12] Steven Johnson, *How Play Leads to Great Inventions*, TED Studio, filmed Oct 2016.

[13] If staff felt they were getting so much out of singing together that weekly sessions were too little, firms could substitute song breaks for coffee breaks. This would save: rainforest, fossil fuels, methane emissions, money and space, sinus and digestive problems and yellow teeth!

[14] A number of large Japanese companies (Mitsubishi and Matsushita are instances) had (and I think still have) their employees start the working day with group song. I don't doubt that the solidarity this activity engenders is thought to improve outcomes by creating relationships that strengthen organisational culture in ways which would lead to better decision making.

[15] Olympia Della Flora, *Creative ways to get kids to thrive in school*, TED Salon: Education Everywhere, January 2019.

[16] Maybury-Lewis D, *Millennium; Tribal Wisdom and the Modern World*, Viking Penguin, New York, 1992.

[17] One Heart Global Music Exchange notes that the Baka Pygmies, hunter-gatherers of the Cameroon rainforest, have an "extraordinary tradition of polyphonic, multi-rhythmic singing, which accompanies most of their daily tasks and rituals, and plays an important role in keeping their culture strong." "This collective music-making deepens your awareness of sound and co-operative listening and is great rhythmic fun." Www.1heart.org.

[18] Maybury-Lewis, op. cit.

[19] Dr Michio Kaku, interviewed by Patricia Karvelas, *Dr Michio Kaku on life, the universe and everything*, RN Drive, ABC Radio National, 7 November 2018.

Abbreviations

ABC:	Australian Broadcasting Commission.
BMI:	Brain Machine Interface.
CO_2-e:	Carbon dioxide-equivalent.
CP:	Concurrent Processing.
DR:	Discount Rate.
EQ:	Emotional (Intelligence) Quotient.
ERS:	Emissions Reduction Scenario.
GNP:	Gross National Product.
IP:	Integrated Processing.
IQ:	Intelligence Quotient.
LP:	Linear Processing.
NPV:	Net Present Value.
PP:	Pattern Processing.
Ppm:	Parts per million.
PV:	Present Value.
RN:	Radio National.
SATB:	Soprano, Alto, Tenor, Bass.
STEM:	Science, Technology, Engineering and Mathematics.
SWOT:	Strengths, Weaknesses, Opportunities and Threats.
TED:	Technology, Entertainment and Design.
WHA:	World Heritage Area.